Interview: “We definitely passed a tipping point for 3-D printers”

By Brendan Day, DTI

Powered by 3D Systems' proprietary Figure 4 technology, the NextDent 5000 is a high-speed dental 3-D printer designed to save time for both patient and practitioner. Dental Tribune International spoke with Rik Jacobs, dental vice president and general manager at 3D Systems; Sebastiaan Cornelissen, CEO of Cordent and Core3dcentres; and Dr Michael Scherer, an American prosthodontist, about the NextDent 5000 and future trends in dentistry.

Is the NextDent 5000 designed specifically with the dental lab in mind, or can it be used in a dental practice as well? Jacobs: Essentially, I designed this product to be used by both labs and clinicians with success.

Sebastiaan Cornelissen: We found that the most important thing was to have a system that can incorporate multiple machines and multiple materials if necessary. This flexibility was the main feature that we were looking for, and the NextDent 5000 delivers this.

What are the benefits of the NextDent 5000 for dental labs? Dr Michael Scherer: For a clinician like myself, there’s been an embrace of 3-D printing in recent years. However, it’s always been the lower-cost trends in dentistry. How did the idea for the NextDent 5000 come about? Jacobs: We got a lot of feedback from users of this printer, like Michael and Sebastiaan, and thankfully, our R&D team in San Diego really listened to what they asked for. The market asked for a printer that would be able to deliver what they need and want. Jacob: We went with it, and five years, more than 50 per cent of dental labs globally will have an in-house 3-D printer. What, in your opinion, is driving this growth? Jacobs: As long as the user is connected to the Internet, he or she will be able to download the latest updates automatically and send files to our printer. It’s predicted that, within three to five years, more than 50 per cent of dental labs globally will have an in-house 3-D printer. What, in your opinion, is driving this growth?

INTERVIEW

Dr Michael Scherer: For a clinician like myself, there’s been an embrace of 3-D printing in recent years. However, it’s always been the lower-cost models that have been prioritised. With the multiple materials and extremely fast printing that the NextDent 5000 offers, I think that clinicians can now offer a realistic chairside solution for patients.

Interview: “We intend to ultimately develop a daily use oral care product with a natural substance”

By DTI

The fight against dental caries has progressed in many ways in which patients can protect and improve their oral health. After much interest in a recently published article on a study into the potential use of berry extract to combat decay-causing bacteria, dental vice president and general manager spoke with lead researcher Dr Nebu Philip, from the University of Queensland in Australia, to discuss this new discovery in more detail.

Dr Nebu Philip, the study sounds very interesting. How did the idea for the research topic arise, and who are you working with? We were interested in developing natural products that could potentially be used to complement fluoride in dental caries prevention. Although there has been extensive literature suggesting the use of natural products for preventing dental diseases, the vast majority of natural product research studies in dentistry are laboratory-based and have not progressed to clinical usage.

I am part of the broad research group called Advanced Materials and Technologies, which is headed by Dr Laurence Walsh. Under this group we have a sub-group focusing on natural products and dental caries – which includes Drs Walsh, Leishman, Randara and myself. I was the lead researcher of the natural product study, with the group coming together three years ago at the beginning of my PhD program.

What was the basis of your research concept? We sought to identify an appropriate natural product. Dark coloured fruit berries are known to contain a variety of phytochemicals beneficial to health. The availability of commercial fruit berry extracts with standardised phytochemical concentrations offered the possibility of testing these polyphenol-rich extracts against key cariogenic bacterial virulence properties. We progressed from a series of laboratory studies to a double-blinded randomised controlled trial in high caries-risk patients. We have presently completed all these studies and are planning our next clinical trial in a larger cohort of patients.

What do you think the most interesting results were? The ability of the berry extracts, especially the cranberry extract, to significantly inhibit Streptococcus mutans virulence without affecting bacterial viability was probably the most interesting result. This suggests the possibility of incorporating the cranberry extracts into a daily use oral care product, for example a mouthwash or dentifrice, to reduce cariogenic virulence without affecting health-associated bacterial species in dental plaque, an important advantage over commonly used synthetic microbes, like chlorhexidine.

Do you have further research plans to develop a new oral health product? Yes. The results of our first clinical trial were encouraging. After further clinical studies, we do intend to ultimately develop a daily use oral care product with a natural substance incorporated into it to protect against dental caries. Watch this space!
New realistic mouth models aim to improve dental education

By DTI

BIRMINGHAM, UK: New research being carried out in collaboration with the University of Birmingham will allow dental students to train on dental models that possess the tactile qualities of real mouths. Among the applications will be learning how to use periodontal probes to check for periodontal disease. The project is being run by Dr Michael Milward, a reader and honorary consultant in periodontics at the university’s School of Dentistry. Dr Paul Cooper, Professor of Oral Biology at the school; and Richard Arm, a senior research fellow at Nottingham Trent University in the UK. The models feature realistic gingivae and tongues to allow students to learn how to examine the mouth and check for disease safely. Both the tongue and the gingivae are made from synthetic gels and fibres and vary in hardness to mimic living tissue, whereas the teeth and jaw bones are made from bone-simulating resin.

“These models meet an unmet need in dental education and will allow us to better prepare our students for clinical work,” said Milward. “The feedback we have received from students and staff has been extremely positive and the final version has already been introduced into undergraduate teaching,” he continued. “While some models are commercially available, no models combine the replica hard and soft tissues in this way to provide a realistic learning experience.”

According to Milward, these developments provide a huge step forward in dental education and benefit not only dental students, but also the retraining dental workforce and patients. The researchers aim to further enhance the models to allow dental students to evolve additional clinical skills.

“The aim is to give students the psychological experience of how it feels to perform real dentistry, but in a safe learning environment,” said Arm. “Until now, current dental models haven’t provided a realistic enough experience for students and the inclusion of a tongue will mimic the challenge which dentists face and better prepare them for their first clinic.”

The mouth models replicate hard and soft tissue to provide dental students with a realistic learning experience. (Photograph: University of Birmingham)