# today

**30th EAO Annual Scientific Meeting • Berlin • 28–30 September 2023**

**Interview**

EAO speaker Prof. Arjan Vissink shares the current state of big data and its future uses in dental implantology.

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**Market report**

Dental implant market report by iData on how post-COVID recovery promotes affordable dental implants and digital workflows.

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**Dental products in focus**

The EAO—DGI joint meeting will be an excellent opportunity to see the most up-to-date innovations in implant dentistry.

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# EAO–DGI joint meeting presents "Berlin reloaded"

Attendees can experience the congress live in 26 languages

■ The European Association for Osseointegration (EAO) and the German Association of Oral Implantology (DGI) are co-hosting a meeting at CityCube Berlin, marking the 30th and 37th anniversaries of the EAO and DGI annual meetings, respectively. The joint event will take place from 28 to 30 September, and the organisers anticipate a turnout of over 5,000 participants. This year's theme, "Berlin reloaded", refers to the originally scheduled 2020 live conference that was cancelled owing to the COVID-19 pandemic.

The congress will focus on three main topics. Firstly, advances in digital technology will be considered, highlighting developments in artificial intelligence (AI), augmented reality, big data and data protection. Secondly, the congress will address the challenges and considerations for the frail patient demographic, given the increasing ageing population. Finally, peri-implantitis will be a significant focus, underscoring its relevance in the field.

"AI is creeping into many areas of medicine, particularly diagnostics. Big data will give dentists the chance to assess personal risk profiles like we've done with other diseases. In the future we'll potentially use big data to establish an individual patient's prognosis or risk profile," said Prof. Henning Schliephake, co-chair of this year's event, in an interview published by the EAO.

He continued: "Augmented reality has moved from theory to practice over the past couple of years, for instance with headsets that project data into the surgeon's field of vision. This kind of tool will probably become part of mainstream dentistry within a very short time. Tools like these will mean that the surgeon can directly match the planning data to the surgical procedure and get real-time feedback."

Commenting on the third congress topic, Prof. Florian Beuer, co-chair and president of the DGI, said: "Peri-implantitis is a topic that we still don't know enough about. There are many treatment approaches and associated questions. At the same time, exciting new discoveries are emerging that should help identify patients who are at risk in the future."

The surgical treatment of peri-implantitis will be explored in the "Battle of Concepts" session. According to the organisers, three approaches to treating peri-implantitis–non-surgical treatment, the resective approach and the regenerative approach–will be addressed. "All three have their indications, along with pros, cons and limitations. These will be discussed alongside footage of three surgical procedures," said Prof. Schliephake.

According to Prof. Beuer, this session will discuss the role of the immune response in peri-implantitis and associated factors such as the shape and material of the implant, as these are often neglected when speaking about the causes of the disease.

The congress will feature 140 speakers from 25 countries, an exhibition, industry forums and hands-on sessions. Although English will serve as the predominant congress language, the DGI sessions will be presented in German. However, all sessions will be available in multiple languages, thanks to simultaneous interpreting services using AI.

More information on the congress can be found at congress.eao.org. ◂◂

# "Very impressive"—the Nexus iOS full-arch restoration system

An interview with Drs Mona Eide-Gast and Gabor Tepper, users of Nexus iOS

■ Full-arch restoration is a complex and time-consuming procedure for both clinicians and patients. To address this, Keystone Dental Group has developed a fully digital and precise solution, the Nexus iOS full-arch restoration system. In this interview, pioneer users of the technology, dentists Dr Mona Eide-Gast from Norway and Dr Gabor Tepper from Austria, share their experiences with the new system and its benefits for patients.

**Drs Eide-Gast and Tepper, could you tell us about how you discovered this solution and your initial impressions?**

*Dr Eide-Gast:* Restoring the full arch in completely edentulous patients is a complex process and requires


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# "Our focus this year is on allogeneic materials"

An interview with Christina Ritchie, head of marketing communication at BioHorizons Camlog

■ BioHorizons Camlog, a diamond partner of the 2023 EAO–DGI joint meeting, is presenting its comprehensive portfolio of various implant systems and regenerative biomaterials at the congress. As head of marketing communication, Christina Ritchie explains in this interview that the company's focus this year is on allogeneic bone grafts and outlines what attendees can expect at the BioHorizons Camlog booth and workshops.

**Ms Ritchie, what can attendees expect when visiting your booth?**

At our booth (#H09), where we are encouraging attendees to engage openly with us, visitors can get to


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BioHorizons Camlog's head of marketing communication, Christina Ritchie.

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good treatment planning. Such restoration is time-consuming and can be challenging for both the clinician and the patient. Nexus iOS is a very impressive system with good protocols for optimal treatment planning that reduces the number of patient visits. It is also fully digital, so it is easier and less messy for the dentist to use and much more comfortable for the patient compared with conventional impressions.

Dr Mona Eide-Gast.

**When you used Nexus iOS, did it live up to your expectations?**

*Dr Tepper:* Up to this point, full-arch scans for implant prostheses had not been possible because the scan was not precise enough to obtain an accurate prosthesis for four or more implants. Thanks to this new technology, through which scan gauges are captured by the intra-oral scanner, this problem is solved. This advancement allows for precise full-arch scans, enabling accurate fitting for both temporary and final prosthesis on multiple–even more than four–implants.

*Dr Eide-Gast:* Even when opening the box in which the prosthesis is delivered, the experience is truly premium. The quality, aesthetics and fit are really high-end.

Usually when engaging in a new procedure, we as clinicians have to make some adjustments and some practice and learning are to be expected. With Nexus, the protocols are very easy to follow, and the online technical support is good and efficient. It is an easy, clean, exciting and fully digital procedure with predictable results. We are happy to have been given the opportunity to try it and are so far very happy with the quality of the product.

**How easy is it to get started?**

*Dr Tepper:* It is very easy. As most clinicians already have an intra-oral scanner, the only extra device they need to obtain is the scan gauge kit from Keystone. It comes with individualised scan gauges, and there are enough gauges for all types of full-arch cases and different types of arches and gingival heights. These scan gauges are meant for multiple use and are designed to last.

*Dr Eide-Gast:* Of course, it is always reassuring to complete proper training with an introduction to the system and different protocols according to the different clinical challenges–even for an experienced clinician who has done many full-arch restorations. Keystone offers courses online and in-person, and the company's specialist staff support dental professionals on-site for their introduction or their first case.

Dr Gabor Tepper.

**Did you have to adapt your existing workflow?**

*Dr Eide-Gast:* With this new, fully digital solution and treatment planning, there is no longer a need for conventional impressions. The number of patient visits and the chair time have been reduced for both immediate and final restorations. For clinicians who are already using an intra-oral scanner for partial cases, the new protocol will be very easy.

**What makes this system revolutionary?**

*Dr Tepper:* The magic lies in the possibility of being able to rely on intra-oral scanning for fully edentulous arches. This makes the process so much faster and simpler for us and our patients. With these new scan gauges, Keystone has found a way to entirely resolve the inaccuracies of fit to the implant that we used to experience.

**What are the main clinical benefits?**

*Dr Eide-Gast:* One is the fit of the prosthesis. We have all had the experience of poor screw alignment when inserting a full-arch prosthesis. It simply does not fit 100%. To make it work, one has to start with one screw, proceed to the next one on the opposite side, and continue crossing back and forth from one side of the prosthesis to the other in this way. With Nexus, it simply fits very smoothly, and the screws can be tightened one after another along the arch.

*Dr Tepper:* Another aspect is occlusion, particularly for full-mouth cases. No adjustment for occlusion is needed–which is impressive! To me, it really speaks to the preciseness of the technology.

**How about financially?**

*Dr Tepper:* For this digital high-end solution, the price is actually very competitive. Clinicians can choose from different materials, and these vary in price. In addition, the investment saves working time.

**Are there any benefits to the patient?**

*Dr Tepper:* Time is the most obvious and significant one: fewer appointments in a shorter period compared with conventional methods. Patient comfort is another benefit. The patient receives a highly predicable, high-quality, aesthetic and economical treatment.

*Dr Eide-Gast:* An additional benefit is the way the prosthesis is presented. It comes ready to use in a very nice small box, like a gift, to be opened in front of the patient. This might be a small detail, but I have found that patients appreciate it.

**What type of clinic or clinician is this solution best suited for?**

*Dr Eide-Gast:* Any clinician with previous experience of full-arch restoration and who wants to work fully digitally could easily use Nexus iOS. It is also suitable for clinicians who want to start performing full-arch restorations, as the Nexus system requires very little investment to get started. Its protocols are easy to follow, and communication with Keystone staff is great.

**You will be speaking about your experiences with Nexus iOS at the Keystone industry forum on Saturday, 30 September, at 12:45. What can attendees look forward to?**

*Dr Tepper:* The Nexus iOS technology is not completely unknown. Other clinicians in Europe have tried it too and reported their experiences. However, many clinicians still do not know about it. I hope that we will be able to share with them the significant benefits of reduced chair time and number of appointments, as well as improved fit, high aesthetics and predictable treatment planning. ◂◂

*Editorial note: More information about Keystone Dental Group can be found at keystonedental.com. EAO-DGI congress participants can learn more about the Nexus iOS system at Booth #B10.*

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know the broad product portfolio of BioHorizons and Camlog, which offers solutions for all three key topics of the congress–advances in digital technology, prosthetic components for motor-impaired patients and peri-implantitis therapy. In order to enable dental professionals and particularly implantologists to provide their patients with the optimal treatment, we offer innovative implant systems with which modern therapy concepts can be implemented as well as a comprehensive range of biomaterials for bone regeneration. Our focus this year is on allogeneic materials, which are available in particulate form as blocks or shells and are, in our opinion, setting a trend for use in the creation of stable implant sites.

**Since allogeneic materials are a current trend in implantology, BioHorizons Camlog is holding workshops dedicated to this topic at the meeting. Can you tell us more about them?**

On Friday, we will host two workshops focusing on allogeneic substitutes. The first workshop will be held by Prof. Daniel Rothamel from Germany, who is an expert in the field of bone regeneration. The workshop will be held in German with English interpretation available. In the theoretical part of the training, he will expand on basic biological information before discussing bone augmentation techniques and demonstrating the successful application of the allogeneic materials with patient cases. In the hands-on part of the training, the participants will be able to practise the handling of the materials and the different techniques on a model.

**What topic or concept will be presented in the second workshop?**

Dr Robert Oretti, a well-known teacher and mentor on all aspects of cosmetic and dental implant therapies from the UK, is a proponent of the concept of open wound healing and will demonstrate its possibilities in modern implant therapy and explain the aspects that must be considered in this treatment concept. In this hands-on workshop, participants will be provided with the necessary decision-making criteria as well as a risk assessment guide to help them choose the correct treatment option for each specific indication. One of the important expected outcomes of the surgical procedure is the preservation of the mucogingival junction, even in the case of tension-free closure of the soft tissue over the bone graft.

**Are allogeneic bone graft substitutes an alternative to the gold standard—autologous bone harvesting?**

There is now increasing evidence that allogeneic materials are a good alternative to autologous grafts. In the workshops, both speakers will present new data and therapy concepts for allografts, pointing to the potential clinical relevance of these materials in implant dentistry.

**What do you personally expect from your participation at the meeting?**

For me, the personal exchange and the expansion of my knowledge relating to this evolving area are important. I want to learn about the challenges dentists and surgeons alike are facing around the world and to hear how we can best support them to find a solution. The opportunity for discussion, meeting with experts whose research has been cited in the lectures and the chance to learn from and with my peers are my goals. ◂◂

*Editorial note: More information about BioHorizons Camlog can be found at www.biohorizonscamlog.com. The company is showcasing its products at Booth #H09.*

today about the publisher

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# Big data in implant dentistry— “We are standing at the beginning”

An interview with Prof. Arjan Vissink, University of Groningen

© Prof. Arjan Vissink

Prof. Arjan Vissink.

■ A highlight of the 2023 EAO–DGI joint meeting is the session on big data and artificial intelligence in implant dentistry. Oral and maxillofacial surgeon Prof. Arjan Vissink from the Faculty of Medical Sciences of the University of Groningen in the Netherlands will be participating in that session. In this interview, he gives readers a glimpse of what he will be talking about, including the current state of big data in the field, its future uses and its challenges.

**Prof. Vissink, what possibilities does big data offer in dentistry right now, and what does the future hold?**

Very few studies have used big data in implant dentistry. We are standing at the beginning. Not much can be said yet of the impact of observations from big data in implant dentistry with regard to diagnostics, risk profiles and prognosis. So far, there has only been cursory study done in this area. Some aspects explored include implant type and diameter used (irrespective of the brand), indication and application, for example immediate or delayed loading, and whether bone augmentation was needed, in addition to general health perspectives, such as smoking, diabetes, immunological diseases, radiotherapy in the head and neck region, and bisphosphonates, with regard to overall implant survival. It has also been investigated whether an oral surgeon or periodontist has a better implant outcome, but the indications for implant placement were not assessed. Whether implants are good solutions in elderly patients has also been studied, specifically for supporting prosthetic restorations and how underlying diseases could compromise the outcome in this situation. The data reported so far is not sufficiently robust to guide decision-making.

**Technical innovations are being developed faster than ever before. When will big data be more commonly used in dental practice?**

At the moment, there is no direct use of the results of big data studies in implant dentistry for daily dental practice. Only very rough overall data is available, and it is not tailored to the individual patient. There is no data available on immediate or delayed placement, immediate or delayed loading, one- or two-stage procedures, or when an implant site should be considered compromised, etc. We should first begin to better record implant procedures, restorations, procedures used in the upper and lower jaw, situations that necessitate bone regeneration, the implant platform used and more. From such data, better general conclusions could be drawn, and eventually, better recommendations for the individual patient could be made. Although innovations are evolving rapidly, it will be quite some time before the dental practice and the individual patient in particular will benefit from these achievements.

**Can you share some tips for dental professionals who want to get more involved with artificial intelligence and the use of big data?**

Dentists should first start with a uniform description of procedures, such as a standardised questionnaire for the initial data collection for as many patients as possible. Better conclusions could be formulated from such data even if they are not yet tailored for the individual and apply just at a group level. It will take much longer before the conclusions drawn from big data research will have a direct impact on individual patient care.

**What challenges does the use of big data in dental practice entail?**

Big data in implant dentistry is in its infancy. First, a standardised database should be designed in which all details of implant placement and restoration can be recorded in a standardised manner. Standardisation of the data entries will be a starting point for many future studies. Next, dentists who place implants and/or make the prostheses for these implants should take the time to create a record in the database for every patient they treat. Time spent on building the database is time that cannot be used for patient treatment, but it will bring implant dentistry further in the long run. Once the data entry process becomes routine for the dentist, the time requirement will become minimal.

**The use of modern technologies also raises concerns regarding data protection. How can this issue be addressed? And are there any other issues that need to be considered when handling personal medical data?**

All data can be collected in an anonymised way. We must ensure that insurance companies or organisations who could gain financially cannot access this data. For example, all patient data could be coded in the database using a code only known by the treating physician. Thereafter, all implant-specific data could be added to that database. An example of big data documentation is the case of the database used for patients with Sjögren’s syndrome, a rare autoimmune disease affecting, among other things, the eye (keratoconjunctivitis sicca) and the mouth (hyposalivation, xerostomia). More than 15,000 well-classified Sjögren’s patients are anonymously registered in a very valuable database documenting their disease. Those responsible for using the data and writing arising research reports have no access to the patient files. When data is missing or incomplete, the treating clinician is asked to provide the missing data where possible. Financially, there is barely any support.

> *“We should first begin to better record implant procedures, restorations, procedures used in the upper and lower jaw, situations that necessitate bone regeneration, the implant platform used and more.”*

**What are the three main messages from your EAO lecture that you would like attendees to take home?**

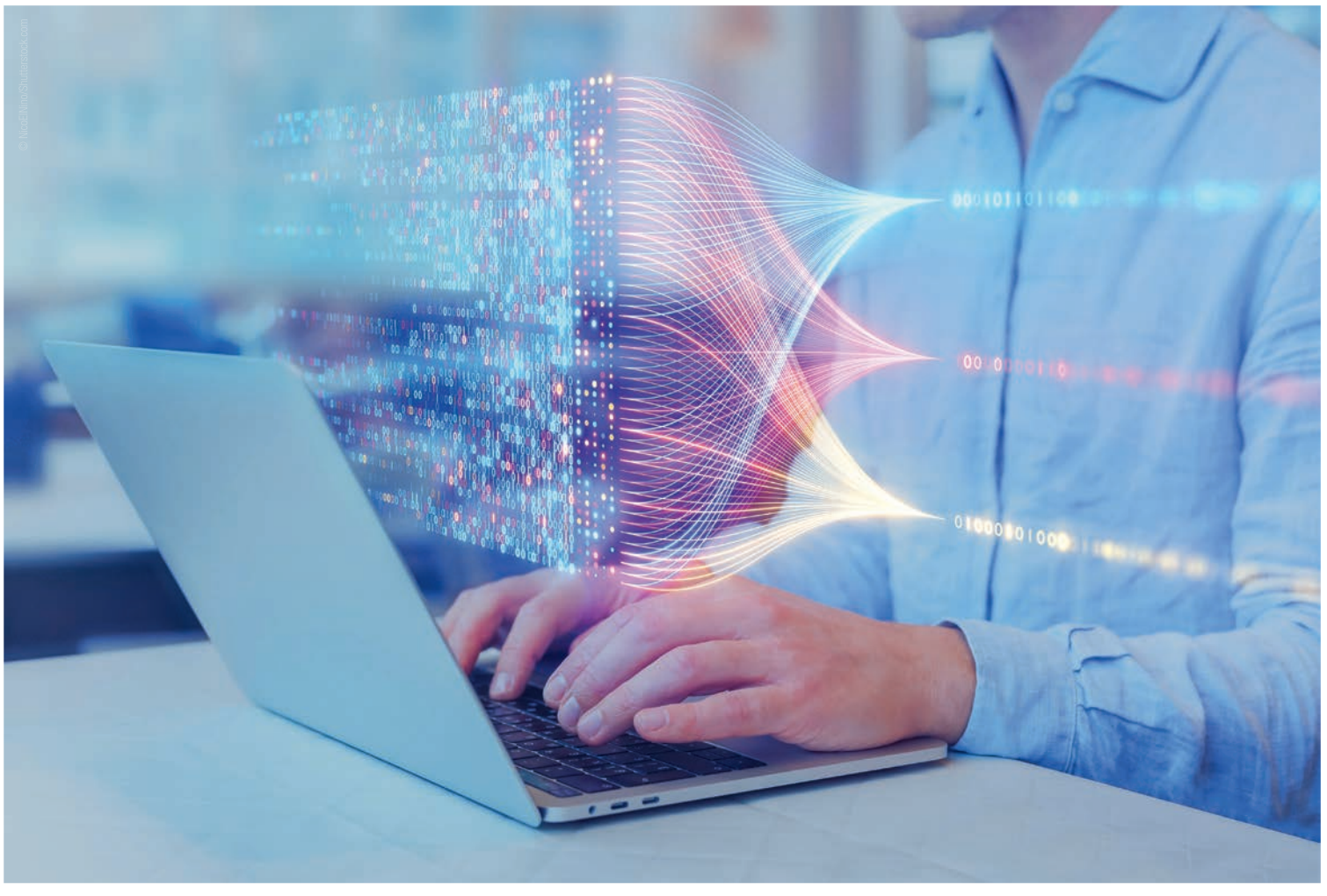
Big data in implant dentistry is just getting started. There is no generally approved protocol as to what parameters to evaluate and how to score. First, the content of the questions through which data will be gathered must be arranged, in addition to determining how those responses will be reported.

Thus far, only very general trends have been reported with regard to implant dentistry.

We have to agree on the creation of a standardised database in which all results related to implant treatment will be recorded. ◂◂

*Editorial note: Prof. Vissink’s lecture is titled “Digital implant dentistry reloaded: Big data in implant dentistry” and will take place during the session from 13:15 to 14:45 on 28 September.*

> *“Big data in implant dentistry is in its infancy. First, a standardised database should be designed in which all details of implant placement and restoration can be recorded in a standardised manner.”*



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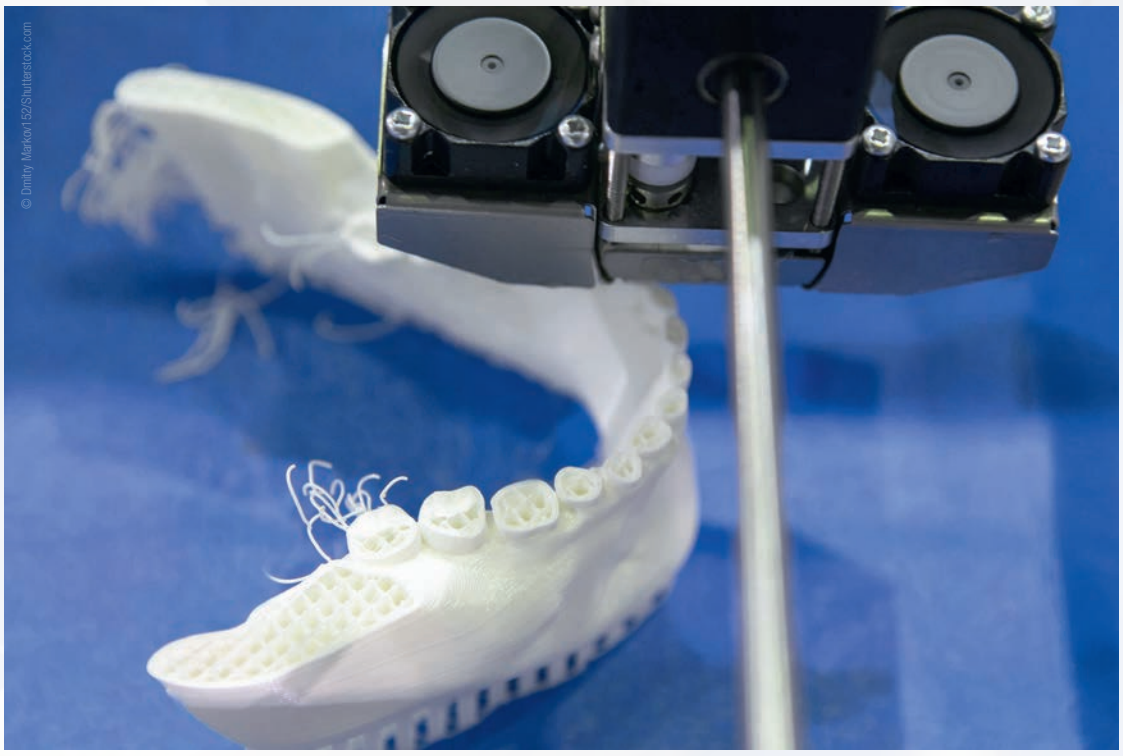
# Researchers create go-to guide for all things 3D printing in implantology

It is never too late to learn what value 3D printing can add to existing practice. By Anisha Hall Hoppe, Dental Tribune International

■ Dental implantology is no longer just about milling. Technological leaps in additive manufacturing have hastened both the pace at which dental clinicians can provide implant treatment and the extent to which they can personalise it. To help clinicians keep up with the rapid advancements, a team of researchers from Xi'an in China has published a comprehensive review of the current state of additive manufacturing technology in implantology. For the convenience of our readers attending the EAO–DGI meeting, we have created a summary of their review, including some of the technologies they cover.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˄ A new review makes understanding 3D printing in implantology much easier—and all those acronyms!

## Commonly used 3D-printing technology in implantology

Without delving too deeply into the many potential applications, such as surgical guides and titanium meshes for regeneration, it is first key to know the fundamentals of 3D printing in implantology. Manufacturers in the field of implant dentistry primarily employ one of four main types of additive manufacturing processes. Most clinicians will recognise the acronyms referring to the sub-technologies of these types, as 3D-printing companies use these to advertise their particular technology.

The four overarching categories of additive manufacturing are vat photopolymerisation (VPP), powder bed fusion (PBF), material extrusion (MEX; also known as fused filament fabrication, FFF) and material jetting. VPP uses light to harden liquid resin layer by layer into the desired 3D shape. PBF uses a heat source like a laser or electron beam to fuse powder materials, such as plastic, metal, ceramic and glass, layer by layer to form the 3D object. MEX, likely the most well-known method, pushes material (commonly plastic) through a heated nozzle that moves around to deposit the material layer by layer according to the 3D design. Material jetting creates objects much like a regular inkjet printer, but instead of ink, it sprays liquid materials that are instantly polymerised by UV light.

VPP encompasses three separate sub-technologies. The first methodology is stereolithography (SLA), which uses a high-intensity UV laser to polymerise the resin, tracing each layer of the object. It is ideal for creating detailed and accurate objects,but can be slower because it has to draw each layer. Digital light processing (DLP) is the second method. Unlike SLA, which polymerises resin bit by bit, DLP projects the light on to the whole layer of the object being printed at once, making the process faster. However, DLP might not provide as much detail as SLA. The third technique is Continuous Liquid Interface Production (CLIP), a faster version of DLP. In CLIP, the object is pulled from the vat of resin while the UV light constantly projects on to the next layer. An oxygen layer stops the resin from polymerising at the bottom of the vat, allowing for continuous printing and fast production.

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PBF is commonly used for creating metal parts used in dentistry, for example titanium implants and cobalt–chromium frameworks, fabricated either through selective laser melting (SLM) or selective laser sintering (SLS). SLM fully melts the powder (typically metallic) to form each layer of the object. It is typically used for making strong, dense parts. In contrast, SLS does not completely melt the powder. Instead, it heats it up until it sticks together to form the object, and SLS is usually used with plastic or ceramic powders. The third subtype of PBF production is electron beam melting (EBM), which is similar to SLM but uses an electron beam instead of a laser. It has the advantages of high energy utilisation and high power density, making it suitable for implant production.

Regarding MEX technologies, many clinicians will be familiar with fused deposition modelling (FDM). FDM melts thermoplastic filament and extrudes it on to the build platform, creating the object layer by layer. It is an inexpensive, popular method for hobbyists and prototyping, but does not offer the same level of detail as SLA.

For higher-resolution parts, material jetting, specifically PolyJet technology, is a useful option that does not require a secondary polymerisation process and offers greater precision than is possible with SLA.

## Producing surgical guides

Surgical guides have been produced with 3D printing for more than ten years. Being fast and economical, SLA is the most widely used technology for guide fabrication, but PolyJet technology has been proved to produce more accurate guides.

Factors affecting the accuracy of surgical guides:

1. *System errors:* These errors are generated during CBCT scanning and data conversion and are beyond human control.
2. *Manufacturing errors:* These are associated with the type of 3D printer used, selection of printing materials, use of supporting structures, and the slicing method and software types.
3. *Layer thickness and build angle:* Research indicates that printing at 50 µm layer thickness gives better overall guide dimensions than printing at 100 µm. Also, printing at 0° and 45° build angles results in the most accurate surgical guides.
4. *Other factors:* There are additional considerations that can influence the accuracy of surgical guides, such as guide position, fixation method, type of guide, flap approach, implant system, sterilisation method and support mode (i.e. bone, soft tissue or teeth).

## Fabricating implants

Customised implants can be made to closely mimic the natural tooth root, giving a more personalised implant—a root-analogue implant. This customisation allows the implant to better match the extraction socket, improve stability and mimic the natural gingival profile. Data from CT or CBCT scans is used to build a 3D model of the teeth, and then CAD software is used to design the implant, which is then printed. The whole process ensures that the stress conduction and distribution are similar to those of natural teeth. 3D printing can also create patient-matched implants that are not as customised as root-analogue implants, but are still optimised for specific patient needs, such as narrow-diameter implants for patients with insufficient alveolar bone width.

Titanium, titanium alloys and zirconia are the primary materials used for 3D-printed implants. Some researchers have proposed using titanium for the root portion and zirconia for the abutment for ideal osseointegration and soft-tissue attachment.

## Further potential optimisation using 3D printing

The authors of the review include additional insight into further uses of 3D printing within implantology, as well as discuss emerging materials, technologies and innovations that clinicians should take note of.

> *"3D printing has multiple applications in the restoration stage of implant therapy and can offer numerous advantages over traditional techniques."*

3D printing has multiple applications in the restoration stage of implant therapy and can offer numerous advantages over traditional techniques. The use of 3D-printing technologies not only increases efficiency and precision but also reduces the risk of error and the amount of material waste. However, attention should be paid to the choice of 3D-printing technology, the selection of materials and the printing process to ensure that the resulting products meet the required standards.

The study, titled "Additive manufacturing technologies in the oral implant clinic: A review of current applications and progress", was published online on 20 January 2023 in *Frontiers in Bioengineering and Biotechnology*. ◂◂

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# MinerOss™ A
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**Benefits of MinerOss™ A human bone substitute [2–5]**

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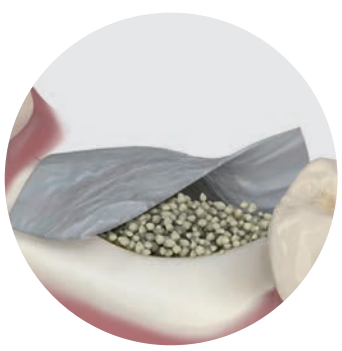
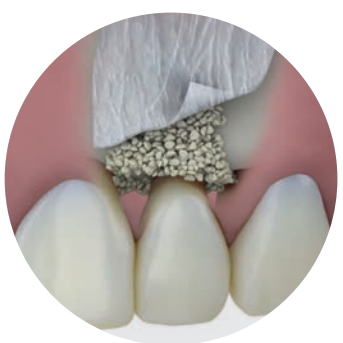


Regeneration of extraction sockets



Regeneration of periodontal osseous defects

Regeneration of gaps between alveolar wall and dental implants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**References available at: www.biohorizonscamlog.com/references_minerossa**



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biohorizons camlog

# Volume-based procurement set to revolutionise dental implant therapy in China

Half-price implant therapy stokes change. By Jeremy Booth, Dental Tribune International

■ China has enacted new rules for the pricing and procurement of dental implants, leveraging its colossal buying power to slash the cost of treatment at public hospitals. Dental manufacturers had two choices: exit the Chinese implant market or join the bidding for bulk orders in the country's volume-based procurement (VBP) programme. International companies are already benefiting from increased sales volumes in China, and analysts in the country say that the new market dynamics stand to increase the quality and breadth of domestic implant therapy, education and manufacturing.

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Analysts say that an increase in the number of dental implant procedures in China will lead to improvements in the quality of locally made dental implant products.

China's National Healthcare Security Administration (NHSA) capped the cost of implant therapy in 2022 with the aim of improving quality of living standards for its ageing population. Health authorities had called for public submissions, and around 90% of submissions supported the measures. English-language newspaper *China Daily* published details of the submissions, and one highlighted the plight of an 82-year-old patient who had had four implants placed at private hospitals in the past two years. The patient said that she was offered consumables from US and European manufacturers at costs ranging from a few thousand yuan to over CNY 30,000 (€3,795). Having settled for value implants made in South Korea at a total treatment cost of around CNY 5,500 per tooth, the patient commented: "I would certainly pick more expensive ones if I were younger. But as I'm over 80, I think these cheaper ones will suffice."

The medical fee per implant placed at public hospitals was capped at CNY 4,500 (€569), significantly lower than the fees of CNY 6,000–CNY 9,000 that were previously charged. The first round of government-led bulk procurement for implants took place in Chengdu in January this year, and average unit prices reportedly fell by 55%. The median price of premium, Swiss-made implants dropped by 63% to CNY 1,850 from CNY 5,000, according to NHSA figures, meaning that price reductions exceeded the health authority's initial expectations. Purchase agreements were not made public, but 39 companies out of a pool of 55 bidders were said to have left Chengdu with bulk orders.

The price cuts took effect in March and April this year across the country, and their effects—combined with the release of pent-up demand from COVID-19 restrictions—boosted the earnings of major implant manufacturers the Straumann Group and Envista Holdings Corp., which owns implant specialist Nobel Biocare.

The Asia Pacific region was the largest contributor to Straumann's second-quarter revenue growth. China's VBP programme not only lowered the cost of Straumann implants sold in China by around 45%, but also narrowed the price gap between the cost of its implants and those of competitor brands. As Straumann CEO Guillaume Daniellot pointed out to analysts, "Patients are also willing to upsell their treatment as the price gap is much lower than it was pre-VBP."

Envista CEO Amir Aghdaei said: "VBP has narrowed the pricing difference between Nobel Biocare and other competitors in the local market, and this has encouraged many clinicians to trade up to our leading implant solutions." Aghdaei told analysts that an acceleration in demand during the second quarter led to mid-single-digit sales growth in China that effectively offset the impact of value-based pricing.

## Challenges and opportunities for Chinese domestic implant manufacturers

The dental implant industry in China is less developed than that of Asia markets like South Korea. The number of implantologists and clinicians trained to perform implant surgery in the country is estimated to be fewer than 10,000, and pre-VBP figures from China insights consultancy Yicai Global show that around 21 implants are placed per 10,000 inhabitants annually in China, compared with 630 in South Korea and more than 100 in most developed Western countries. According to Chinese analysts, VBP could change this.

China's VBP programme already covers pharmaceuticals and other medical devices and is expected to soon be extended to dental crowns and bone grafting products. According to a 2022 white paper by US analysts at procurement intelligence and analytics provider Beroe, China's use of VBP aims not only to lower government health expenditure and provide uniform pricing throughout the nation but also to increase domestic technological innovation in the field of medical devices.

Hu Xuan, a medical device analyst at vbdata.cn, a Chinese healthcare service platform, told China Daily that the rapid fall in prices will be a major turning point for the domestic dental industry. Hu said: "The price drop will help increase patient visits to dental institutions [...] In addition, the bulk procurement programme mainly targets public hospitals, and private institutions can still maintain autonomy, bringing a positive influence to the overall industry."

According to vbdata.cn figures, at the end of 2021, domestic implant brands accounted for just 15% of total market share—99 of a total of 117 implant products on the market being imported. Hu pointed out that domestic manufacturers have some catching up to do, not only in terms of market share but also in terms of increasing acceptance of their products among Chinese clinicians. Whereas leading international brands like Nobel Biocare and Straumann were using fourth-generation technologies that increase biocompatibility, strength and resistance to corrosion, Hu said that domestic brands were mainly using the second-generation surface technologies of simple coating as well as sandblasting and acid etching treatment. He also commented that there was a lack of domestic clinical trial data and that these factors were leading to Chinese clinicians opting for international implant brands.

Lyu Sang, a consultant at oral medical device research and development enterprise Denfac, told the newspaper that VBP will promote the development of domestic implant brands, offering a window of opportunity for increased innovation that will lead to the emergence of leading domestic brands. Lyu explained: "The dental implant industry develops through rising orders. Once orders go up, enterprises will make more profits. Through the national-level or provincial-level bulk procurement programmes, the market share of domestic dental implant enterprises is expected to rise."

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However, advancements in the Chinese implant market are also expected to cause growing pains. Lyu said: "[Once] enterprises win the bid, demand for production capacity, supply chain delivery and personalised clinical guidance all raise challenges for domestic brands. They should ramp up efforts to rise up to the challenges."

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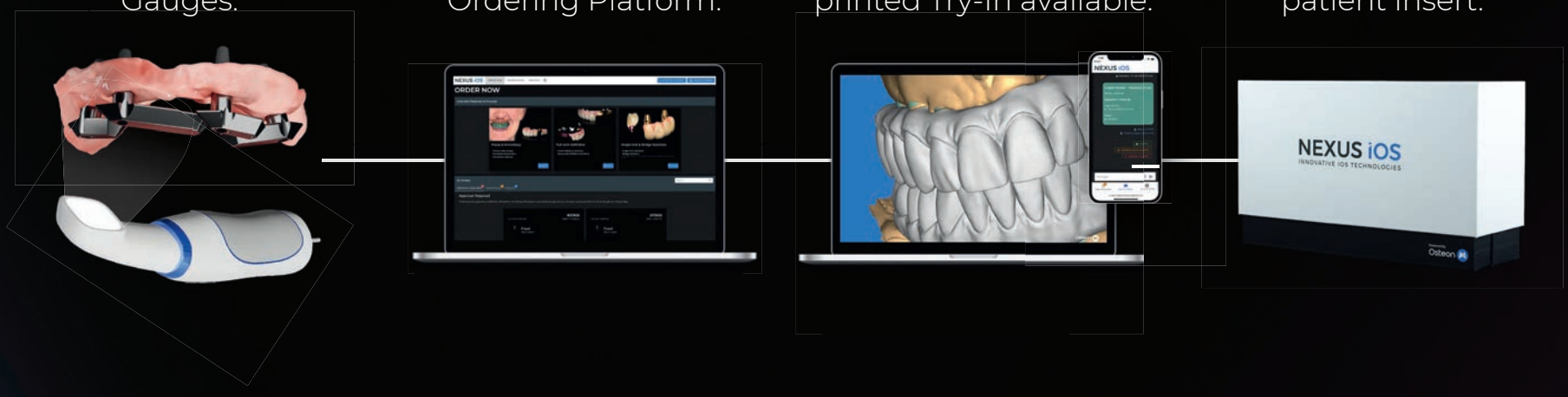


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