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INTERDISCIPLINARITY

In an interview, Prof. David Herrera (European Federation of Periodontology) explains why general practitioners and oral health professionals should work together more closely.

Page 6



CLINICAL

Dr Michael Braian from Sweden presents a case study about the comprehensive dental rehabilitation of a patient utilising a digital workflow.

Page 10



SUSTAINABILITY

According to Dr Sanjay Haryana, sustainable dentistry helps to make the workplace more attractive, is ethically correct and can serve as a great marketing tool.

Page 12

The future of dentistry: What will oral care look like in 2040?

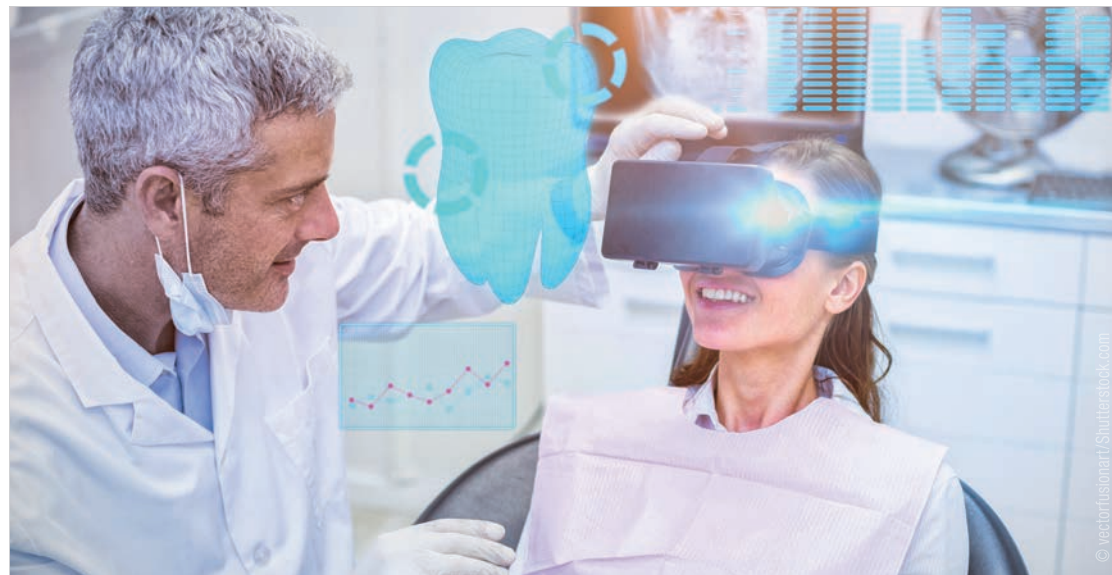
Smarter ways of doing dentistry will benefit patients and dental teams

Dr Anne Mette Stougaard,
Denmark

Smart toothbrushes and intra-oral sensors that continually monitor biomarkers in the oral cavity, efficient and free dental services based on preventive and collaborative care strategies, a mobile app that provides patients with preliminary triage and dental care guidance—a new way of doing dentistry may be just around the corner. Let us gaze into the crystal ball and see what might be possible if we dare to imagine it.

Screening on the playground

The calendar reads 2040. Five-year-old Ava is at the playground with



her mother after her afternoon snack. Suddenly, Ava holds her cheek and says: "Ouch, my tooth hurts!" Her mother asks: "Which tooth is it, honey?" and Ava points and says: "Right there by my finger." Her mother responds: "Okay, sweetie. Let's take a picture and send it to tooth chat for help."

Ava opens her mouth, and her mother takes out her phone and opens tooth chat in her dental app, where she is greeted by the app's chatbot, which is powered by artificial intelligence (AI) and guides her in taking a perfect photograph of the area. Using augmented reality, she can see what the photograph should look like

→ Page 2

Study finds intra-oral scanner viable alternative to visual clinical evaluation in detecting caries

Anisha Hall Hoppe,
Dental Tribune International

There has been very little research done to compare the efficacy of intra-oral scanners with that of visual examinations in detecting dental caries. By comparing the two methodologies in detecting and classifying occlusal caries, researchers have now determined that use of a 3D intra-oral scanner is as valuable as a visual clinical inspection and can be particularly useful for remote assessment and research.

The primary findings noted that, by using an intra-oral scanner, clinicians can avoid the common pitfalls that come with visual examination and associated 2D dental photographs. Standard dental photographs can be significantly affected by lack of suitable lighting and magnification and also by the angle at which an image is taken. Further obstacles

to detecting occlusal caries can include non-carious lesions, excessive saliva and dental plaque. Extensive travel can be required to reach certain patient populations, and this can make it difficult for clinicians to conduct adequate oral examinations.

The researchers used both methodologies to evaluate three surfaces on more than 50 permanent posterior teeth pre-and post-extraction. Prior to extraction, each tooth underwent plaque removal and was evaluated in a standard visual clinical examination in addition to intra-oral scanning. Six months later, the models were evaluated for colour and fluorescence and given a histological score evaluating enamel and dentine demineralisation in relation to thickness. There were no significant differences observed between the caries detection capabilities of the two methodologies.

The researchers suggest that a lack of existing literature is to blame for the hesitancy of some clinicians to adopt an intra-oral scanner for use in detecting caries. They also noted the value of further investigation into additional methods of caries detection using an intra-oral scanner including fluorescence using blue light excitation for early enamel demineralisation and caries detection, transillumination, and near-infrared reflectance.

It was also suggested that intra-oral scanners provide consulting clinicians with easily transferable data useful for comparison and that, therefore, they prove a viable alternative to standard visual evaluation, particularly for clinicians with harder-to-reach patient populations.

The study, titled "Occlusal caries detection on 3D models obtained with an intraoral scanner. A validation study", was published in the April 2023 issue of the *Journal of Dentistry*.



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← Page 1

before she takes it. Once happy with the photograph, she sends it off in the app. The chatbot asks her a few follow-up questions, which she answers either in text or verbally.

A few seconds later, Ava's mother receives an answer from the chatbot: it looks like food impaction in the interdental space between the molars. The chatbot sends some advice and short videos with instructions on how Ava and her mother could try to clean the space between the teeth and thus solve the problem by themselves at home without having to go to the dental clinic.

To be sure of the preliminary diagnosis, the chatbot recommends that Ava's mother take a better intra-oral photograph with Ava's smart toothbrush when they get home. The whole family has electric toothbrushes with built-in intra-oral cameras, making it easy to monitor the health of their teeth and mouths from home.

Ava and her mother walk home to join the rest of the family for dinner. When it is time to brush their teeth before bed, Ava's mother scans Ava's teeth with the smart toothbrush, which automatically sends the scan via the dental app. While Ava is sleeping, her mother can check the response from the app, which always gives a preliminary diagnosis and some home care advice.

The final diagnosis can only be made at the clinic. If further remote assessment is needed, or if Ava's mother has any follow-up questions, an on-call dentist or dental hygienist is always available for a remote tele-consultation via chat or voice or video call.

Biohacking and dental care on subscription

Ava's mother is a biohacker and has gone one step further, having had an intra-oral sensor attached to the buccal side of one of her own mandibular molars. The sensor is a bit like an orthodontic bracket and can constantly monitor the condition of the oral cavity via various biomarkers in the saliva. This means that most dental diseases and imbalances in the oral microbiome can be detected early, allowing disease development to be discovered and reversed before requiring treatment. The electronic dental equipment is obviously expensive to acquire, but its cost is covered by the compulsory dental insurance package that all citizens now have.



“These possibilities will only become reality if someone takes the lead and dares to try out new methods and workflows.”

Of course, the dental care package also includes a fixed quarterly subscription to all the oral care products that have been prescribed by the dental practitioner. Each quarter, a new pack of oral care products is provided, and the old products can be returned in the same box for sustainable recycling.

Healthcare turned upside down

The healthcare system long ago reoriented to care focused on prevention first. Anything else could no longer be justified. When you look back at the system in the 2020s, you shake your head. Back then, dentistry was predominantly geared towards treatment, which made it both ex-

tremely expensive and inefficient. Dental staff were perpetually treating oral conditions in patients and were consequently stressed and suffering burn-out, having to take time off work frequently or leaving the profession early owing to the subsequent effects on their mental and physical health.

Fortunately, in 2025, a few farsighted health professionals, financial experts and politicians reached a broad policy agreement that reshaped the financing of dental care. Under the agreement, basic dental care for all citizens is funded by income tax and additional oral care is financed through a combination of compulsory dental insurance and treatment fees.

Central specialist clinics and local prophylaxis clinics

Celina, a dentist, is resting in the staffroom wearing virtual reality glasses for engaging in a few minutes of guided mini-meditation before she sees her next patient. She is pregnant and needs a little break in which she can put her feet up and take calming deep breaths in a nature-based setting.

She is a specialist in oral-systemic medicine, having completed a relatively new multidisciplinary master's degree programme that is offered by a collaboration between dental faculties and hospitals. She works at the specialist clinic for complicated oral-systemic co-morbidities, where patients from all over the country can have complicated oral diseases treated and monitored and major reconstructions done. Patient capacity at the specialist clinic has been reached, and satellite specialist clinics are set to open in other major cities.

The clinics will collaborate closely, the specialist clinic acting as a mini-hospital and providing the complicated treatments, and the local satellite clinics providing the important basic dental treatments and regular check-ups, prophylaxis and health promotion, as well as the often overlooked trust-creating social interaction between the patient and the dental staff.

The clinics will communicate with each other via a cloud-based dental and medical record system, enabling data sharing and remote monitoring on the basis of extra-oral images, intra-oral scans and AI-assisted radiographs, among others. The system communicates with the common dental app, through which the entire population has access to their own dental records.

The work environment is the strongest currency

Anton, chief of staff at the specialist clinic, is extremely focused on creating the best workplace in the country, where employees want to stay on, take on responsibility and develop their professional skills. Indeed, Anton knows that recruiting great staff is now an advanced

art form, as there is an extreme shortage of competent staff in all sectors.

He has taken the prevention first model one step further by adopting a well-known simple but extremely important approach that prioritises employees. Simply put, if employees are happy, patients and employers are happy too.

At the specialist clinic, the team no longer works with a schedule of fixed appointment times; rather, time intervals are provided. Patients can check in at a fixed time in the local area and then stay within a maximum of 5 minutes' walking distance to the clinic until they receive a notification that the team is ready to receive them for treatment.

Rounding up

This look into the crystal ball shows us that the future of dentistry offers many fascinating new possibilities. However, these possibilities will only become reality if someone takes the lead and dares to try out new methods and workflows. The saying “If you are not evolving, you are dying” can be aptly applied to the recruitment (and retention!) of good staff who look forward to each workday and experience a deep sense of purpose and joy in their work.

I hope you have enjoyed this little sketch of how I think the future of dentistry may look. It is meant solely as inspiration for dental professionals and is based on dental innovation that is happening around the world, futuristic trends, scientific research and current scientific projects. Indeed, some of the technologies mentioned are already being implemented in several countries, and others are still in the developmental stage.

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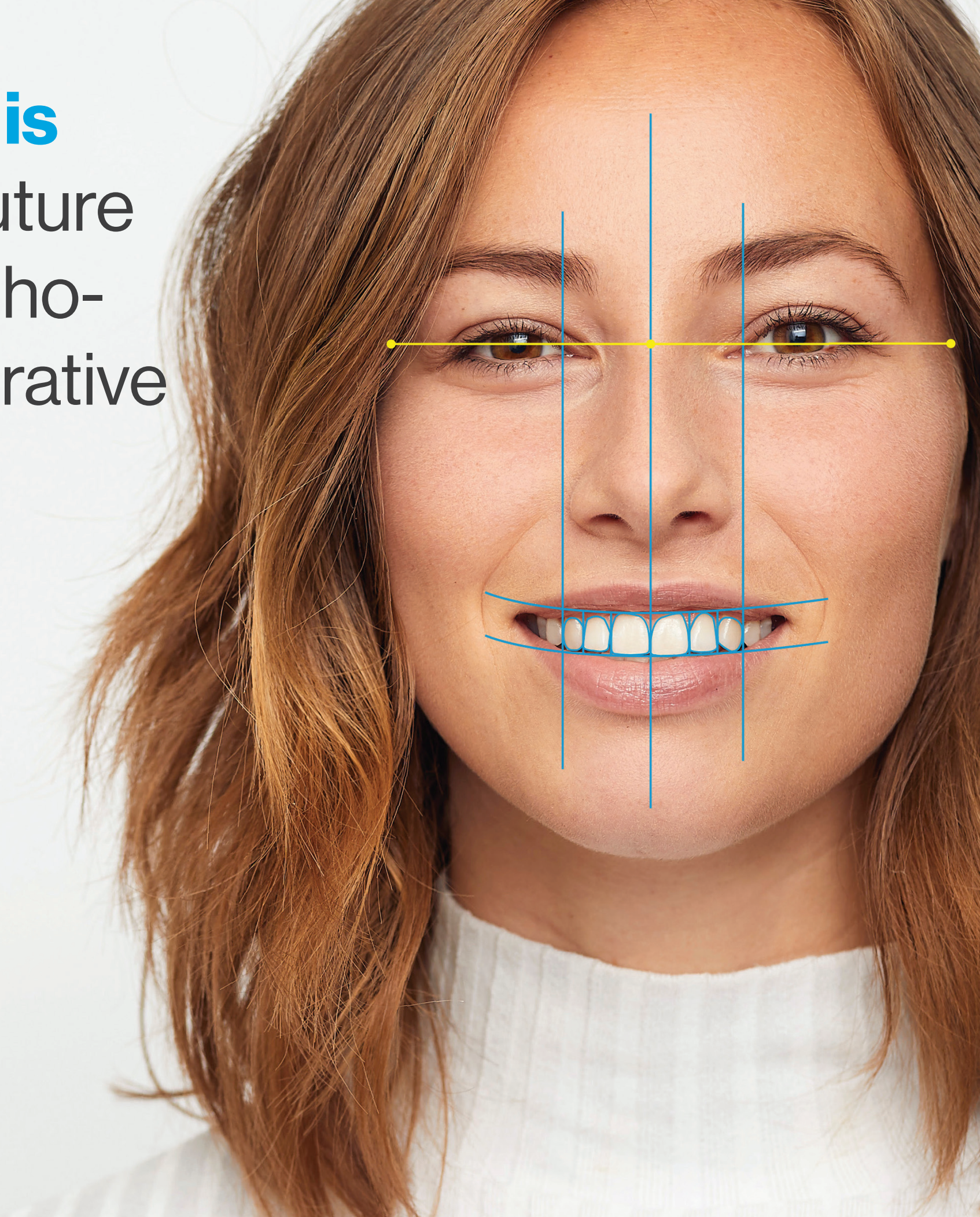
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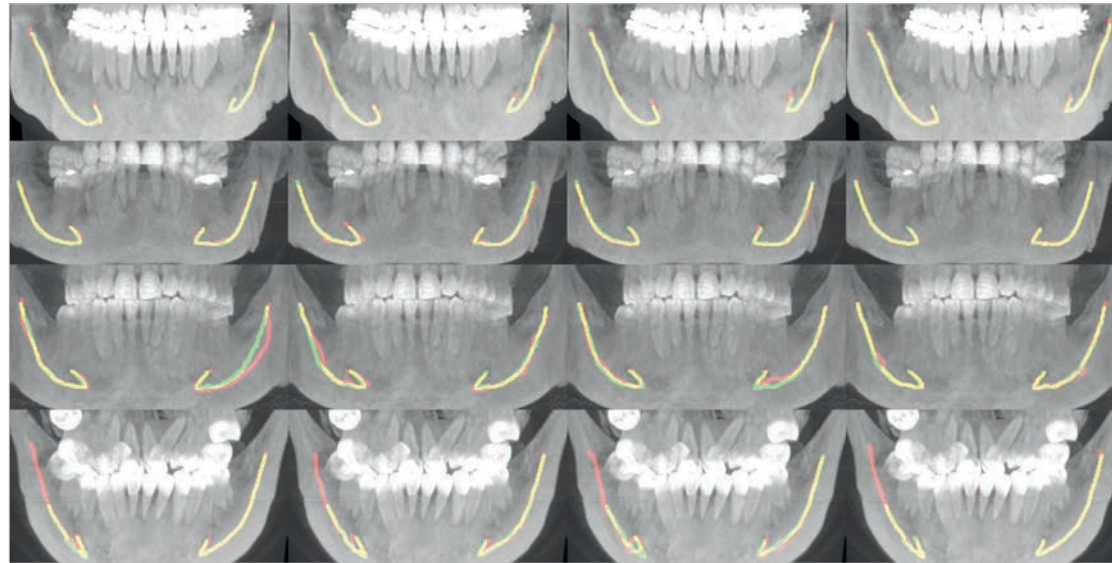
AI may assist in dental implant surgery, localising mandibular canals

Franziska Beier,
Dental Tribune International

Studies have shown that artificial intelligence (AI) can recognise structural patterns in medical imaging data. However, in dental and maxillofacial radiology, only a few studies have used AI to locate mandibular canals. Knowing their exact location is a prerequisite for dental implant planning. Until now, dental professionals have had to examine radiographs to locate the mandibular canal, a potentially complex and time-intensive process. A recent study from Finland has now tested the use of an AI-based model for this purpose and found that it locates canals in 3D radiographs quickly and precisely.

Localisation of the canal in CBCT images is complicated by anatomical variations in the course and shape of the canal according to individual and ethnicity. To avoid compression or other surgical complications, a safety margin of 2mm above the mandibular canal is recommended in implantology. Precise knowledge of canal position is also important for various other oral and maxillofacial surgical procedures, such as jaw surgery or removal of third molars.

Researchers from Aalto University in Espoo, Planmeca and the Finnish Center for Artificial Intelligence (FAI) developed a deep learning system and trained it with 3D images rendered with CBCT. The database consisted of images from five different CBCT scanners from four vendors and patient cohorts of two ethnicities—



CBCT images showing overlaid expert and deep learning system segmentations. Every image on each column is annotated by the same expert, shown in red, the deep learning system annotation is shown in green and overlap is shown in yellow. (Image: © 2022 Järnstedt et al., licensed under CC BY 4.0, no changes)

869 Finnish patients (79%) and 234 Thai patients (21%).

The performance of the deep learning system was clinically evaluated by comparing its results with those of four experienced dental and maxillofacial radiologists. The model accurately segmented the mandibular canal and performed better overall than the radiologists. In addition, it showed promising generalisability with regard to new CBCT scanners and ethnic groups.

“When a huge amount of data is fed to the neural network and the location of the mandibular canal is marked in it, it learns to optimise its own internal parameters. The neural

network resulting from this learning quickly finds the mandibular canal from the individual 3D data input,” said co-author Vesa Varjonen, vice president of research and technology at dental equipment manufacturer Planmeca, which is based in Helsinki, in a press release.

“In clinical assessments, experts went through the results produced by the model and discovered that in 96% of the cases they were fully usable in clinical terms. We are highly confident that the model works well,” commented co-author Jaakko Sahlsten, a doctoral researcher at Aalto University.

“The collaboration arose from the needs of experts practising clinical work

and from seeking ways to help their everyday work. A lot of time can be saved by using artificial intelligence in patient treatment planning,” said Varjonen.

“Tampere University Hospital provided us with extensive and versatile clinical materials produced with several 3D-imaging devices. The data was divided at random and part of it used for training the neural networks and part of it isolated for testing and validating the designed method,” said Sahlsten.

Planmeca to integrate the model in its imaging portfolio

For Planmeca, a Finnish family business and one of the world's

leading equipment manufacturers in health technology, the collaboration with FCAI and Tampere University Hospital means significant new business potential.

“Digitality and AI used in imaging equipment are important for us. We will integrate the neural network model developed in this research into our imaging software. This will improve the usability and performance of our equipment,” said Varjonen.

Model for orthognathic surgery

In addition, the collaborative research project developed a neural network model for orthognathic surgery. “The model helps to identify landmarks in the skull area for correcting malocclusion and planning jaw alignment surgery,” said Varjonen.

“I see artificial intelligence as a very powerful tool that physicians and other experts can use when making their first assessments or to get alternative opinions. The challenge with deep learning models is that we cannot give definite grounds as to why the model reaches a specific outcome. Further research is needed to increase the explainability and transparency of the models,” concluded Sahlsten.

The study, titled “Comparison of deep learning segmentation and multigrader-annotated mandibular canals of multicenter CBCT scans”, was published on 3 November 2022 in *Scientific Reports*.

Large-scale study links periodontitis and inflammatory bowel disease

Franziska Beier,
Dental Tribune International

Even though previous research has suggested a link between periodon-

titis and inflammatory bowel disease (IBD), the relationship and its impacts have not been fully explored. In a large-scale study—the first of its kind in a European population—researchers

from Malmö University, in collaboration with other Europe-based researchers, have found evidence for a strong connection between the two diseases.

IBD is a group of inflammatory disorders of the gastrointestinal tract, principally Crohn's disease and ulcerative colitis. The incidence of IBD is increasing worldwide, and more than 1.3 million people in Europe suffer from it. Its cause remains unknown, but an inappropriate immune response is considered to be involved.

Periodontitis and IBD are chronic inflammatory diseases with similarly complex pathogeneses. “Both diseases can be described as a strong over-reaction of the immune system against a theoretically relatively mild bacterial trigger. You can say that the immune system attacks one's own body,” explained co-author Prof. Andreas Stavropoulos from the

Faculty of Odontology in a university press release.

The study was conducted in Denmark and the data collected via an online questionnaire answered by around 1,100 patients with IBD (of whom approximately half had Crohn's disease and the rest ulcerative colitis) and around 3,400 matched controls without it.

The evaluation of the survey responses showed that patients with IBD had a higher probability of perceiving the overall health of their teeth and gingivae as worse and of having severe periodontitis. Those patients diagnosed with Crohn's disease reported worse oral health than those diagnosed with ulcerative colitis and had higher odds of having lost more teeth than the control group.

“The study shows that patients with IBD have more periodontitis and

fewer teeth compared to people without IBD. We also see that patients with IBD and periodontitis have an aggravated intestinal disease with a higher activity than patients with IBD who have no oral health issues,” commented Prof. Stavropoulos.

Based on the study results, the research team concluded that patients with IBD should be kept under close surveillance in order to prevent the development of periodontitis and/or to slow down its progression. “Similarly important, it may be that treatment of periodontitis has a positive impact on the management of IBD,” emphasised Prof. Stavropoulos.

The study, titled “Periodontitis prevalence in patients with ulcerative colitis and Crohn's disease—PPCC: A case-control study”, was published in the December 2022 issue of the *Journal of Clinical Periodontology*.



Background music found to enhance dental students' clinical competence

Iveta Ramonaite,
Dental Tribune International

In a recent study carried out at the University of Eastern Finland, researchers have investigated the effect of slow background music on dental students' preclinical manual skills training. They found that background music can effectively reduce dental students' stress and improve their motivation and performance during preclinical tooth preparation exercises.

Dental students often experience great stress during their studies, which may have serious repercussions on their mental health. Various studies have previously reported that music can have a positive impact on emotions and well-being. It has also been shown that background music can promote education and learning and can increase student satisfaction and productivity.

Adding to the existing literature, researchers from Finland examined whether background music can influence preclinical dental students'



anxiety levels or performance during preclinical practice. The study included 36 third-year dental students who filled in a questionnaire that measured their subjective evaluation of the effects of slow background music on the stress or anxiety levels experienced during a preclinical cariology course.

The data suggested that more than 50% of the dental undergraduates felt that slow background music helped to relieve stress while preparing

the teeth, and 68% of the students thought it helped with stress reduction while doing cavity restorations. Students reported enhanced relaxation and reduced feelings of stress during complex procedures and higher levels of positive feelings when practising while listening to slow background music.

Additionally, 24 out of the 36 students participated in a cross-over study on the impact of slow background music on the quality of cavity

preparation and on the time taken for this procedure. These students were split into two groups. The first group listened to background music such as classical, jazz or slow pop music while working, whereas the second group worked in the normal ambient noise of the simulation laboratory.

Using music for cavity preparation

For the purpose of the study, the researchers used a virtual reality haptic dental trainer and monitored the students' basic manual skills. Using ImageJ software and macro-photographs of the prepared teeth, they also examined how slow background music can improve students' cavity preparation performance during their preclinical simulation training.

The researchers found that the majority of the students were satisfied with listening to background music during practice. Music was found to reduce stress while increasing the motivation to learn and practise. According to the students, back-

ground music did not disrupt communication in the classroom. Additionally, it was found that background music enhanced the students' use of time during cavity preparation and improved the quality of the procedure.

In line with the findings, the researchers believe that dental educators should be aware of students' learning obstacles and take steps to improve their emotional well-being. To that end, the study has shown that playing soothing background music during preclinical training sessions might benefit students' education. Finally, the researchers believe that music intervention could also be an effective tool to reduce stress in other dental education environments.

The study, titled "Influence of background music on stress reduction and impact on performances during students' simulation exercises", was published online on 9 May 2023 in the *Journal of Dental Education*, ahead of inclusion in an issue.

Finnish study shows patients could benefit from more support in using dental vouchers

Anisha Hall Hoppe,
Dental Tribune International

Dental care accessibility is an issue facing many countries with some such as Finland addressing the unserved population by creating a unique voucher system to ensure all patients in the public healthcare system receive care, even by private providers. Through a questionnaire, a team in Finland has investigated the perspective of adult patients on using a recently introduced type of dental service voucher in an effort to improve accessibility to the system. The responses to the survey indicated that though the new system is an improvement, patients still require more support to use the subsidised vouchers effectively.

The voucher system in Finland was created to mitigate treatment gaps created by an overfull public dental service by subsidising the treatment costs of private providers. Five types of vouchers have been created since the system's inception in 2011, and the vouchers can be used fully or partially to cover various aspects of dental treatment planning and implementation.

Called KOHO, the new voucher system introduced in 2021 improved upon previous voucher schemes, which resulted in partially used vouchers that increased demand but sometimes resulted in incomplete

dental treatment or treatment split between the private and public system. KOHO provides subsidies for non-urgent comprehensive treatment instead of specified treatment types. It also ensures that a private dentist handles the treatment from beginning to end, preventing care being broken up between systems and providers.

The researchers evaluated various aspects of patient experiences of using the new KOHO scheme, including ease of use, whether patients felt that had they received adequate assistance and information, experience with using the electronic service voucher system and whether patients would prefer to use the public dental service instead of the voucher system. They also included a question on perceived oral health.

While 38.9% of the voucher recipients surveyed had used a voucher before, 31.0% said that that it would have been preferable to use the public dental service instead of using a voucher. More patients (7% more) with good perceived oral health used the voucher system than those with poor perceived oral health. Being able to receive treatment without a significant wait was the primary reason for using the vouchers according to the study, followed by being given no other alternatives for receiving treatment.



The results suggest that more can be done to identify patients who need support to effectively use a dental service voucher, particularly because it is a multistep process. Some patients reported that they felt that they were not treated the same as other patients when they presented their vouchers at a private clinic. Patients also indicated that they had not been given

a choice of whether to receive public care or voucher-subsidised care.

While only 24.5% of the participants in this study were elderly, it also built upon previous research which showed that for elderly patients specifically vouchers were more likely to be used for acute rather than preventive services. Past research also found

that social and institutional support as well as health status were associated with effective use of vouchers by older patients.

The study, titled "Dental service voucher for adults: Patient experiences in Finland", was published online on 22 March 2023 in *Acta Odontologica Scandinavica*, ahead of inclusion in an issue.

“Simple interventions by oral health professionals can greatly improve overall health and reduce risks”

An interview with Prof. David Herrera, chair of the European Federation of Periodontology’s workshop committee



David Herrera is a full-time professor, associate dean for clinics and co-director of the EFP Graduate Program in Periodontology at the Complutense University of Madrid in Spain. (Image: © European Federation of Periodontology)

Franziska Beier, Dental Tribune International

It is increasingly recognised that general medical care and dental care should be more closely linked. To that end, the European Federation of Periodontology (EFP) and the European arm of the World Organization of Family Doctors (WONCA Europe) have recently published a consensus report on the basis of a joint workshop aimed at establishing specific recommendations for dental professionals and general practitioners for improved prevention, detection and treatment of cardiovascular conditions, diabetes and respiratory diseases. In this interview, Prof. David Herrera, lead author and chair of the EFP’s workshop committee, speaks about how dental professionals can achieve more holistic care of their patients and about an upcoming campaign to further disseminate the report’s findings.

Prof. Herrera, what was the motivation for the workshop organised by the EFP and WONCA Europe? How did the collaboration among both organisations come into being?

The EFP has long experience in organising high-level scientific workshops, since the first Perio Workshop (then called European Workshop in Periodontology) back in 1993 in Switzerland. More recently, a new workshop format—focused workshops—was established by my predecessor Prof. Mariano Sanz. These are organised in collaboration with other relevant medical associations, with 15–25 scientists, and have focused on the association between periodontal and systemic diseases.

The first one was held in 2017, together with the International Diabetes Federation, and the consensus document was published in 2018 in our *Journal of Clinical Periodontology* and in *Diabetes Research and Clinical Practice*.¹ The second one, in collaboration with the World Heart Federation, took place in 2019, and the consensus report was published in 2020 in both the *Journal of Clinical Periodontology* and *Global Heart*.² In both workshops, endocrinologists and cardiologists strongly suggested a pivotal role to be played by general practitioners in the implications of the identified associations, since they take on most patients with diabetes or cardiovascular diseases.

In the year 2021, then EFP President Prof. Lior Shapira made collaboration with general practitioners a priority for his presidency. Contacts were established with the president of WONCA Europe, Prof. Shlomo Vinker, who was very positive from the very beginning in the development of the process.

How would you summarise the purpose of your workshop?

Our main aim was to discuss and prepare a consensus document, developing and agreeing on a set of recommendations on how general practitioners and oral health professionals could approach the systemic impact of periodontitis on cardiovascular diseases, diabetes and respiratory diseases. A team of nine periodontic experts and nine general medicine experts reviewed the latest evidence available on the associations between periodontitis and the mentioned chronic systemic conditions. For cardiovascular diseases and diabetes, the starting point for the discussions was the outcomes of the previously mentioned workshops. For respiratory diseases, a purposely written systematic review was presented, including the evaluation of the associations of periodontitis with chronic obstructive pulmonary disease, asthma, community-acquired pneumonia, obstructive sleep apnoea and COVID-19.³

“A very important conclusion of the consensus report is that general practitioners and oral health professionals should work together.”

Although specific conclusions were made depending on the evidence of association for the various conditions, the overall conclusion is that oral health professionals and general medical practitioners should collaborate in managing non-communicable diseases (NCDs) and in implementing strategies for the early detection of periodontitis in primary care centres and of cardiovascular diseases or diabetes in dental settings. General medical practitioners should be informed about periodontal diseases and their consequences, and oral health professionals should be informed about the relevance of NCDs and the associated risk factors.

What are some of the most important risk factors that dental professionals should regularly check in their patients?

This information is explained in detail in the consensus report, and it may be too difficult to condense in a few words. However, I can give some examples for each of the groups of diseases covered in the focused workshop.

Oral health professionals should inform patients with periodontitis that their risk of cardiovascular diseases, such as myocardial infarction and stroke, is higher. Hence, oral health professionals should take action by collecting a careful history to assess for cardiovascular disease risk factors (diabetes, obesity, smoking, hypertension, hyperlipidaemia and hyperglycaemia) and by screening for cardiovascular risk factors, including physical activity, excess weight, blood pressure, and lipid and glucose management.

Oral health professionals should try to identify patients with undiagnosed prediabetes and diabetes either by referring the patient to a general doctor or by screening on-site using validated questionnaires or questionnaires and HbA_{1c} point-of-care tests.

For patients with respiratory diseases, recommendations on risk factor control can and should be implemented in both dental care settings and primary care centres: for chronic obstructive pulmonary disease patients, smoking cessation must be promoted in all smokers, and for obstructive sleep apnoea patients, strategies for weight loss and healthy lifestyles should be recommended.

How could general practitioners and dental professionals make sure that their patients will actually receive the appropriate care if they identify any risk factors?

A very important conclusion of the consensus report is that general practitioners and oral health professionals should work together, first, in preventing, detecting and treating major systemic diseases; second, in exchanging information and mutually referring their patients; and third, in promoting healthy lifestyles among them. Being able to implement these three ambitious actions represents a huge challenge, but the publication of this report and the communication campaign we will run later this year are important stones in paving the way for a successful collaboration that will ultimately benefit patients.

For example, it is recommended to periodontists and family physicians to implement effective strategies for early detection of periodontal disease in primary healthcare centres and of cardiovascular diseases and diabetes in dental practices. General practitioners are encouraged to seek information about the periodontal health of their patients and oral health professionals about the cardiovascular and metabolic risk factors.

What would you advise dental professionals who want to treat their patients more holistically but are lacking appropriate guidance?

I honestly believe that this consensus report provides appropriate, updated information and guidance to all oral health professionals. It will dramatically help with appropriate screening of NCDs, including periodontitis, and evaluation of the associated risk factors. Simple interventions by oral health professionals can greatly improve overall health and reduce risks and complications.

What are the EFP’s plans to disseminate the outcomes of the workshop?

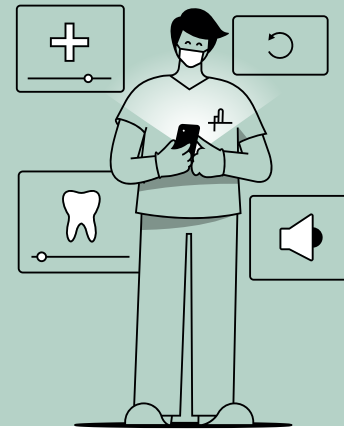
The EFP is currently preparing an outreach campaign based on those outcomes with support from our partner Curasept. It will be ready after summer and will target specific groups, including general medical practitioners, periodontists and other oral health professionals. The key messages will be presented and summarised in the form of infographics and an animated film, which will be made available in English and a few other international languages. The information materials will be made available to the dental community via a dedicated sub-site on our website, www.efp.org, and certainly via social media and other means of publication.

Editorial note: The consensus report, titled „Association between periodontal diseases and cardiovascular diseases, diabetes and respiratory diseases: Consensus report of the Joint Workshop by the European Federation of Periodontology (EFP) and the European arm of the World Organization of Family Doctors (WONCA Europe)“, was published in the June issue of Journal of Clinical Periodontology.

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Financial interests motivate dental professionals to spread misinformation



Anisha Hall Hoppe,
Dental Tribune International

The circulation of health misinformation online has been a topic of concern in recent years, social media providing easy access to wide audiences and little regulation. Researchers from Brazil

conducted an analysis on oral health misinformation online to determine what groups of people were sharing the information and the reasons for doing so. They found that the misinformation was mainly spread by dental professionals with financial motivations and primarily dealt with incorrect

information promoting alternative oral health treatments.

To identify misinformation on dental topics, the researchers, at the University of São Paulo's dental school in Baurú, used Google's advanced search, and the resulting websites were screened by two independent investigators to compile a list of false or misleading messages. The oral health misinformation found was categorised into four types: that created or spread for informational purposes, for political purposes, for financial, social and/or psychological purposes by non-dental professionals and for financial, social and/or psychological purposes by dental professionals. The spread of this misinformation was investigated on Instagram, Facebook and Snopes, and CrowdTangle was used for tracking misinformation posted on Instagram and Facebook.

Most (41.9%) of the misinformation items were found to have been produced or disseminated by dental professionals with financial, social and/or psychological interests, followed by misinformation created or spread by non-dental professionals

with such interests (24.8%), misinformation with informational interests (24.2%) and misinformation with political interests (9.1%). Five prevailing topics were identified, in descending order: periodontal disease, root canal therapy, toothache, fluoride and dental caries. Facebook was the primary platform used for the transmission of the identified pieces of misinformation, followed by Instagram.

Snopes was noted to have debunked only 5.9% of the misinformation identified by the team. The researchers suggested that this may indicate a lack of criticism by and awareness of oral health information seekers and thus this topic of misinformation not coming to the attention of Snopes.

The team also identified anti-fluoridation propaganda as a focus of content connected to political interests and found that information about public health policies was systematically depreciated on social media platforms because of the overriding political interests of platform users. Misinformation produced or disseminated with financial interests

was statistically more common than misinformation with political interests however.

Misinformation created or spread by dental professionals was more commonly shared on social media. Misinformation with financial, social and/or psychological interests produced or disseminated by dental professionals and misinformation with political interests occurred significantly more than misinformation with informational interests on Instagram. The researchers noted that it was difficult to determine whether the posts by dental professionals were fraudulent. They thus supported the development of artificial intelligence algorithms for improved detection of health misinformation in addition to improved oral health education interventions and suggested that dental professionals and dental health companies need to be aware of their responsibility in providing correct oral health information.

The study titled, "Exploring online oral health misinformation: A content analysis", was published online on 29 May 2023 in *Brazilian Oral Research*.

Hackers steal millions of dental patient records

Jeremy Booth,
Dental Tribune International

A breach of data systems belonging to Managed Care of North America (MCNA) Dental has resulted in the theft of a trove of personal information and patient records belonging to nearly nine million individuals insured by the provider. The apparent ransomware attack represents the largest breach of health information so far this year and underscores the sensitivity of data relating to dental treatment.

A data breach notification showed that information pertaining to these

8,923,662 individuals was stolen from MCNA Dental's computer systems over a period of ten days—between 26 February and 7 March. The notification showed that the breach was discovered on 3 May. MCNA Dental issued a notice of data breach on 26 May, alerting its customers to the unauthorised activity in its computer system and the theft by criminals of substantial amounts of private information and dental records.

MCNA said that the stolen information included personal and contact details and identification and health insurance numbers. Information about

oral care was also stolen, including details about patient visits, past treatments, medication provided, patient radiographs and photographs, and details about the dentists and doctors who had provided care. The stolen information included copies of bills and insurance claims, and some of it related to other individuals who had paid for patient treatment, such parents, guardians and guarantors.

The MCNA Dental notice read: "We quickly took steps to stop that activity. We began an investigation right away. A special team was hired

to help us. We learned a criminal was able to see and take copies of some information in our computer system." MCNA Dental said that it had sent letters to customers whose information had been stolen and was using online notices to attempt to reach those whose postal addresses it did not have on file.

Affected individuals have been offered free identity theft protection for a period of 12 months.

Online technology news portal TechCrunch reported that ransomware group LockBit had claimed

responsibility for the cyber-attack and that the Russia-linked hacking network had published all of the stolen MCNA Dental data online after the insurer declined to pay a ransom of US\$10.0 million (€9.3 million). "A listing on LockBit's dark web leak site, seen by TechCrunch, suggests the notorious ransomware gang stole 700 GB of data during the intrusion," TechCrunch wrote.

MCNA Dental says on its website that is the largest provider of dental insurance to individuals enrolled in the government-sponsored Medicaid and Children's Health Insurance Program healthcare schemes.

New study investigates 3D-printing use in dental practice

Iveta Ramonaite,
Dental Tribune International

A recent survey conducted by the American Dental Association (ADA) investigated the prevalence, applications and user experience of 3D printing in dentistry. It found that, although the use of 3D printing in dental practice is currently low, those who adopted it reported improved efficiency and reduced cost. The aim of the study is to inform current users about other users' experiences and to advise non-users about the potential benefits of the technology.

The survey report considered the responses of 277 members of the ADA Clinical Evaluators Panel. It found that only 17% of the participating dentists currently use a 3D printer in their practice, of which 67% have been

using it for less than two years.

"Although this survey found that 3D printer use in private practices is currently low, it is growing due to workflow efficiencies and expanded applications associated with continuing developments and progress with these technologies," co-authors Dr Kevin Frazier, vice dean and professor of restorative sciences at the Dental College of Georgia at Augusta University in the US, and Dr Marta Revilla-León, director of research and digital dentistry at the Kois Center in the US, said in a press release. "Non-users should continue to monitor these trends for adding 3D printing in their own practices."



The most common uses for a 3D printer were to complement or enhance other digital technologies, control workflows, improve efficiency, use existing digital skills or procedures, and reduce cost or manufacturing time.

Regarding usage, nearly half of the users said that they use a 3D printer for 25% of their cases per month, mainly for diagnostic models (62%), followed by splints and occlusal devices (50%) and then surgical guides (48%). The most common problems experienced with 3D printing involved software and printing failure.

Among the 83% respondents who do not use 3D printers, 44% cited using a laboratory, 39% high financial investment and 34% lack of perceived benefit as their reasons for not using 3D printing. Among non-users, 21% were considering investing in a 3D printer and 35% were considering undergoing training.

"3D printing was chosen for this survey because it was one of the top four topics on several 'hot' or 'emerging' trends in dentistry lists, and we wanted to know how our colleagues were responding to the advances in 3D-printing technology that have led to expanded applications for practice," Drs Frazier and Revilla-León noted.

The report was published in the April 2023 issue of the *Journal of the American Dental Association*.

More implants for less

China rocks first-quarter results with volume-based procurement

Jeremy Booth,
Dental Tribune International

The first quarter of 2023 delivered mixed results for the largest dental companies. Consumers around the world continued to rationalise their spending during the three-month period, owing to the financial impacts of Russia's invasion of Ukraine; however, it was China's implementation of volume-based procurement (VBP) for dental implants that rocked the boat and offset gains made in other regions.

Dental Tribune International (DTI) reported earlier this year that China had adopted VBP for dental implants, leveraging its colossal buying power to secure low prices. Dental manufacturers have two choices: exit the Chinese dental implants market or join the bidding for bulk orders. As a leading manufacturer of dental implants, Straumann Group opted for the latter.

Straumann's results showed that gains in European dental markets were offset by a significant and rare decline in the Asia Pacific (AP) region, where COVID-19 and VBP constricted earnings. The company posted AP sales of CHF 80 million (€80 million), and this represented a year-on-year drop of 28.9%. CEO Guillaume Daniellot explained to analysts in early May that markets in the region had largely performed well—particularly Japan, Australia, Thailand and India. "However, due to the expected strong headwind coming from China, which hampered the region's results, the Asia Pacific region recorded negative organic growth of 23.5%," Daniellot said.

COVID-19 infections and restrictions severely disrupted patient flow in China until mid-February, and the country's VBP programme nearly halved unit prices of Straumann implants. Daniellot told analysts that VBP pricing was swiftly implemented in both public and private dental settings during the period. He said that the VBP programme already covered around 80% of the country's dental implants market and was expected to apply to nearly all dental implant sales by the end of June. Daniellot said that Straumann earned 40% to 45% less for each dental implant that it sold in China and that the total volume of implant sales in the country was up by 25%.

Straumann performed better in other regions. Sales in the Europe, Middle East and Africa region totalled CHF 287 million—up 7.2% year on year—and sales in North America increased by 7.0% year on year to reach CHF 182 million. In Latin America, a region that Daniellot labelled a "continuous highlight", sales grew by 20.1% year on year to reach CHF 47 million. Straumann's total revenue in the first quarter was CHF 596 million, up by 1.1% year on year, and organic growth was 3.4%.



Restructuring at Dentsply Sirona leads to net loss

Dentsply Sirona's US sales increased by nearly 15% in the period; those in European markets increased marginally, and sales outside of these two key markets were flattened by persistent headwinds from China.

Glenn Coleman, chief financial officer at Dentsply Sirona, told analysts that sales in China decreased by 30% during the period. "The good news is we're seeing a really nice recovery as we exit [the first quarter] and even stronger recovery in the month of April relative to our implants business in China," Coleman said.

VBP aims to cut the cost of dental implant treatment at public hospitals, and Dentsply Sirona's Chinese implants business mainly serves private dental settings; Coleman confirmed that unit prices have dropped by up to 40%, nonetheless. "[That] is, in fact, what has happened," he said.

Dentsply Sirona expects to sell a greater number of dental implants in China this year and that revenues from these sales will remain flat. Coleman explained: "I think once we get to the end of this year, the volume should offset the price reduction. And I previously made a comment [during the] last call that I expect China to be flat on a full-year basis despite being down 30% in the first quarter. I think my view right now is China should be growing this year, given what I am seeing right now in the last couple of months. So, we are more bullish on China, but still cautious."

At US\$978 million (€900 million), first-quarter net sales at Dentsply Sirona increased by nearly 1.0% and by 5.1% on an organic basis. Sales of dental consumables increased by 6.4% to reach US\$430 million, and sales of technologies and equip-

"I expect China to be flat on a full-year basis despite being down 30% in the first quarter"—
Glenn Coleman, chief financial officer, Dentsply Sirona

ment dropped by 3.0% to settle at US\$548 million. The dental heavyweight incurred restructuring costs of US\$71 million and posted a net loss of US\$ 19 million for the quarter.

Mixed performance at Envista Holdings

First-quarter sales of US\$627 million represented a year-on-year decrease of 0.7% for Envista, and core sales at the company declined by 2.4%—a drop that Envista had anticipated, according to CEO Amir Aghdaei.

Strong growth in specialty products and technologies business during the quarter was offset by challenges that the company faced in the Chinese and Russian markets and by a general weakness in the company's capital

equipment business. According to Aghdaei, high interest rates and lingering economic uncertainties are still having an impact on major dental equipment purchases.

Envista's orthodontic business grew by 12% during the quarter, helped along by the establishment of the premium Ultima bracket system and sales of Spark clear aligners, which recorded 70% sequential sales growth. Global sales of dental implants declined by low single digits, owing to significant declines in China and Russia.

"Geographically, as anticipated, we declined substantially, overall, in both Russia and China. The decline in Russia was primarily due to unusually strong performance in the first quarter of 2022 as clinicians pre-purchased

inventory at the start of the conflict in Ukraine," Chief Financial Officer Howard Yu explained to analysts.

Early in the quarter, the impact of COVID-19 in China resulted in disruptions to Envista's operations. "At one point, 75% of our own people had COVID, and we had asked them not to come to work and stay home and take care of their well-being," Aghdaei commented.

Envista's dental implant business in China is worth around US\$1 million, and Aghdaei said that developments in the market related to VBP are playing out as the company had expected. "We have seen significant reduction in prices in the public sector as well as the anticipated spillover into the private market. While it is too soon to be sure, the early indication is that demand for our implant should increase as we pick up additional share in the public sector and the VBP programme positively impacts long-term patient demand," he said.

A degree of volatility

Dental patient volumes in most markets were stable at or near pre-pandemic levels, according to Henry Schein CEO Stanley M. Bergman; however, a degree of volatility persists. Commenting on the current shape of the dental business, Daniellot emphasised that uncertainties remain and that geopolitical tensions had not eased during the first quarter.

Aghdaei said: "While the dental community remains confident in the long term, they also are mindful of the short-term uncertainty driven by higher interest rates, the lingering risk of a recession and the various geopolitical risks occurring around the world. This uncertainty is expected to create a degree of volatility as we move throughout 2023."

The impact of VBP on dental manufacturers is expected to ease as volume increases lessen the effects of lower unit prices. China has implemented VBP programmes for a slew of pharmaceutical and medical product categories. This is good news for the country's ageing population, which is already enjoying the benefits of substantial savings at pharmacies, hospitals and dental clinics.

