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REPORT

A paperback edition of the latest Australian National Child Oral Health Study is set to be released this month.

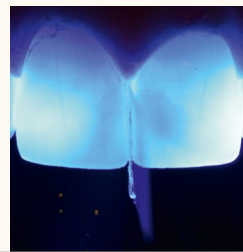
► Page 2



INTERVIEW

Jordanian endodontist Dr Ibrahim Abu Tahun on how new developments are changing the way endodontics is practised.

► Page 10



RESTORATIONS

This case report describes the use of partial veneers for achieving highly aesthetic results in the anterior region.

► Page 12

Dentist shortage to worsen

By DTI

HONG KONG/SINGAPORE: Owing to their growing and ageing populations, Hong Kong and Singapore are at risk of a serious lack of dentists in the years to come, experts have warned. Both are not equipped to meet the changing needs and demands of an increasingly older population with the current numbers of locally trained dentists.

According to a Hong Kong government report due to be released in the next several months, most of the city's medical professions—including dentistry—will face shortages in the next ten years, the *South China Morning Post* has reported. Proposing solutions for the predicament, the report's commission recommends increasing the number of overseas-qualified health staff working in public hospitals under limited registrations, among other measures.

To date, public hospitals in Hong Kong have been allowed to recruit foreign doctors under a



Hong Kong and Singapore are in danger of a severe shortage of medical and dental professionals in the years to come, experts have cautioned.

registration scheme that is limited to one year. However, owing to stringent conditions that restrict foreigners from working in the private sector, only 12 medical professionals joined via the scheme last year, according to the *Post*. In order to address the predicted shortage of health care

workers, these numbers would have to at least triple and contract terms be extended to attract more doctors, the report's experts cautioned.

In Singapore, this situation is presently a lived reality in the dental profession. Here, foreign-

trained dentists already made up the majority of new dentists registered in recent years. For example, in 2014, only 46 of the 187 newly registered dentists were local graduates, the *Straits Times* stated in an article.

► Page 2

MI World Symposium

TOKYO, Japan: As host of the MI World Symposium in Tokyo on 5 February, Japanese dental manufacturer GC Corporation arranged an impressive scientific line-up to discuss the latest concepts in the field of minimal intervention dentistry. International and regional clinicians and researchers discussed various topics, including MI management strategies and materials solutions, as well as clinical aspects of the philosophy, taking into account parameters such as age, disease status and treatment options.

The company's minimal intervention approach was developed based on an MI concept proposed by the FDI World Dental Federation in 1999 and introduced one year later. In order to enable realisation of the concept in clinical practice, the GC Europe MI Advisory Board later developed the Minimal Intervention Treatment Plan.



A skull being examined with the PlanScan intra-oral scanner. Read how Planmeca's 3-D imaging devices have helped advance fossil research. ► BUSINESS Page 8

Regionally connected

Through analysis of the teeth of two 7,700-year-old hunter-gatherer women discovered in a Russian cave, UK researchers found that their genetic make-up closely resembled that of modern-day populations in the region. This indicates that certain ethnic groups across north-east Asia have migrated very little for around eight millennia.

More free dental care

The University of Queensland is expanding its free dental care for disadvantaged populations owing to a new partnership with Metro North Hospital and Health Service. Through the alliance, which began in January, the university expects to be able to serve an additional 8,000 patients at its new oral health centre in Herston.

Fighting implant infections

A team of researchers at KU Leuven in Belgium has developed a dental implant that gradually releases antimicrobial drugs to stop a biofilm forming on the surface and thereby help prevent infections. "Our implant has a built-in reservoir underneath the crown of the tooth," explained lead author Dr Kaat De Cremer.

"A cover screw makes it easy to fill this reservoir with antimicrobial drugs. The implant is made of a porous composite material, so that the drugs gradually diffuse from the reservoir to the outside of the implant, which is in direct contact with the bone cells." So far, the implant has only been tested in the laboratory.



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AD

Atopic dermatitis linked to higher caries risk



New findings from a Singaporean study suggest that infants with atopic dermatitis might be at a higher risk of developing caries as toddlers.

By DTI

SINGAPORE: New research from the National University of Singapore (NUS) and the Singapore Institute for Clinical Sciences of the Agency for Science, Technology and Research has suggested a link between two common childhood diseases: atopic dermatitis and dental caries. In the study, infants who had symptoms of the skin condition and were sensitive to

common allergens were three times more likely to develop tooth decay at 2 and 3 years of age compared with infants without the skin inflammation.

Atopic dermatitis, also known as atopic eczema, is a chronic, relapsing form of inflammatory skin disease that is characterised by symptoms such as itchy, red, swollen or cracked skin and a rash. Over the last years, the condition has

been on the rise and affects approximately 15–30 per cent of children in developed countries today. As for dental caries, a 2009 NUS Faculty of Dentistry study found that four in ten preschool children in Singapore suffered from some form.

In the current study, which was part of the Growing Up in Singapore Towards Healthy Outcomes programme, the researchers interviewed about 500 parents during their child's first year, at three, six and 12 months, respectively, to identify infants with eczema. Those children whose mothers reported them as having the skin condition were given skin prick testing to assess their sensitivity to common allergens.

The results showed that infants who had eczema and were positive to common allergens were 3.29 times and 3.09 times more likely to experience caries when they were 2 and 3 years of age, respectively, compared with infants without the dermatitis.

"Our latest findings will give parents and caregivers of babies with eczema early warning of increased risk of developing tooth decay in toddlers," NUS researcher Dr Stephen Hsu told the Strait Times. "Regular dental check-ups can then be conducted to help minimise the incidence of tooth decay in these children."

According to the research team, it is the first time a link between both conditions has been discovered. A possible mechanism behind the connection could be structural defects that occur during tissue development in the uterus. However, in order to confirm the underlying biological mechanism of the relationship, the researchers are now conducting further genetic analyses.

The study, titled "Atopic dermatitis and early childhood caries: Results of the GUSTO study", was published online on 22 January in the *Journal of Allergy and Clinical Immunology*.

Dental health of Australian children still a concern

By DTI

ADELAIDE, Australia: The University of Adelaide Press has made the findings of the 2012–14 National Child Oral Health Study (NCOHS) available for free download, with a paperback edition set to be released in March. The NCOHS sampled 24,664 children aged between 5 and 14 years across 841 schools and collected data regarding their dental health behaviours, access to dental care services, overall oral health status and other associated factors.

The collaborative work has been collected in a report under the title *Oral Health of Australian*

Children: The National Child Oral Health Study 2012–14 and aims to provide an accurate and concise look at children's dental health throughout the country. The information was collected through a questionnaire filled out by parents and an oral examination performed by a qualified dental professional. The data was then analysed to estimate the prevalence of dental caries, dental fluorosis and other dental health issues and how these varied with social characteristics.

The study found that oral health is still a significant health issue for Australian children, despite some small improvements.

Over 40 per cent of children aged between 5 and 10 years had experienced caries in their primary teeth, and the overall rate of carious lesions was consistently higher among children from lower education, low-income households. Additionally, children living in Queensland and the Northern Territory—two jurisdictions with more remote communities and lower levels of water fluoridation than the national average—were more likely to have dental caries and at a greater level of severity. The report ultimately offers a data set that can be used for further analysis of methods for improving children's oral health, according to the editors.



The 2012–14 National Child Oral Health Study sampled 24,664 children across Australia.

The report is available as a free e-book from www.adelaide.edu.au/press.

Page 1

However, while the integration of foreign-trained dentists into the local workforce may help to ease the shortage in the years to come, it is not the only challenge both cities are facing owing to changing demographics. "With an ageing population, demand for dental services is not only increasing but also changing due to the more complex dental needs of geriatric patients," Singapore's Chief Dental Officer Dr Patrick Tseng Seng Kwong said.

There are currently too few dentists specialised in geriatric

care to serve the growing needs of the population. In 2014, specialist dentists made up 16.4 per cent of dentists in Singapore, according to figures from the annual Singapore Dental Council report. Consequently, the city-state's Ministry of Health has started to offer scholarships for postgraduate studies in geriatric and special needs dentistry. Other efforts to improve the situation to this end include the opening of Singapore's first dental centre functionally designed to cater for the elderly and people with special needs, the Geriatric Special Care Dentistry Clinic, in Outram in June 2016.

With measures such as this, Singapore might well be on its way to improving the situation. In Hong Kong, by contrast, a planned reform of the Medical Council of Hong Kong, a regulatory and statutory body that grants licences to foreign doctors, has already faced substantial opposition. Medical professionals and patients alike have raised concerns that relaxed licensing requirements for mainland and foreign doctors, aimed at making it easier for foreign doctors to practise in the city, could compromise standards. In a recent survey, 78 per cent of

1,003 general public respondents opposed the idea of exempting overseas doctors from local examination to practise in Hong. As for practitioner and Election Committee respondents, 83 and 85 per cent, respectively, opposed the plan.

This is despite the fact that Hong Kong's public hospitals have been documenting chronic shortages in the medical workforce for years. In 2016, the city's public clinics were understaffed by 250 doctors and 700 nurses, according to hospital records.

IMPRINT

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Increase in healthy life years through sugar, fat and salt taxes

By DTI

MELBOURNE, Australia: Modelling the effect of different combinations of taxes on sugar, salt and fat and a subsidy on fruits and vegetables on the death and morbidity rates of Australians, a new study has found that imposing a tax on sugar could avert about 270,000 disability-adjusted life years. In addition, the research estimated that, when combined to maximise benefits, taxes and subsidies could reduce the country's health care spending by A\$3.4 billion.

In the Western world, non-communicable diseases, such as obesity, diabetes, cardiovascular disease and dental caries, are mainly attributable to an unbalanced intake of fats, sugars and salt. In order to tackle the burden of those diseases, an increasing number of countries have already implemented or proposed taxes on unhealthy foods and drinks. However, the actual cost-effectiveness of levies and subsidies on certain nutritional items to reduce the burden of diet-induced diseases is uncertain and can only be estimated.

In the current study, researchers at the University of Melbourne simulated the effect of different combinations of taxes on unhealthy foods and a subsidy on fruits and vegetables based on the Australian population of 22 million in 2010. The model analysis set the sizes of the taxes and subsidy such that combined there would be less than a one per cent change in total food expenditure by the average household.

The results showed that a tax on sugar had the greatest impact among the taxes simulated. A sugar tax could avert 270,000 disability-adjusted life years (DALYs), the researchers calculated. DALYs are years of a healthy lifespan that are lost to disease. This equals a gain of 1.2 years of healthy life for every 100 Australians alive in 2010, which is a health outcome that few other public health interventions could deliver across the whole population, according to the researchers.

In comparison, a salt tax was estimated to save 130,000 DALYs, a saturated fat tax 97,000 DALYs and a sugar-sweetened beverage tax 12,000 DALYs. As for a fruit and vegetable subsidy, the study was unable to determine an isolated clear health benefit, although it too made for additional averted DALYs and reduced health sector spending, the researchers wrote.

The study adds to growing evidence of large health benefits and cost-effectiveness of using taxes and regulatory measures to influ-

ence the consumption of healthy foods. Based on the results of the models, the formulation of a tax and subsidy package should therefore be given more prominent and serious

consideration in public health nutrition strategy, they concluded.

The study, titled "Taxes and subsidies for improving diet and

population health in Australia: A cost-effectiveness modelling study", was published online on 14 February in the *PLOS Medicine* journal.



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“A preventative health care system is also a cost-efficient health care system”

An interview with Prof. Jörg Eberhard, Australia

By Kristin Hübner, DTI

On the occasion of this year's World Oral Health Day (WOHD) on 20 March, Prof. Jörg Eberhard from the University of Sydney will be pre-

Dental Tribune: Can you explain what is meant by the title of your lecture, “Putting the mouth into health”?

Irrespective of this body of knowledge, a holistic view on medical conditions that includes oral health has not been estab-

major challenge for the dental profession. Furthermore, teaching of the association between oral and general health to medi-

“A holistic view on medical conditions that includes oral health has not been established in clinical medical practice.”



Prof. Jörg Eberhard

senting the Australian WOHD lecture, titled “#PuttingTheMouthIntoHealth—Time for a paradigm change in dentistry!”. *Dental Tribune* had the opportunity to speak with Eberhard, who was appointed the university's first Chair of Life-span Oral Health in 2015, about the role of preventative care in research and clinical practice and the general need for a more holistic view on medical conditions and oral health.

Prof. Jörg Eberhard: Research over the last several decades has shown that oral disease is linked to general health and other diseases, including cardiovascular disease, diabetes mellitus and rheumatoid arthritis. The available evidence demonstrating this association is based on epidemiological studies, clinical intervention trials and knowledge of sound biological mechanisms.

lished in clinical medical practice. “Putting the mouth into health” stands for the strategic vision of overcoming this shortcoming and is aimed at improving the community's health.

How does oral health affect general health?

Dental caries and periodontal disease are the most common diseases worldwide and responsible for a large part of today's disease burden. Caries results in pain, tooth loss and enormous treatment expenses. Each of these conditions negatively affects school attendance during childhood, reduces the ability to ensure good nutrition and to participate in a healthy social life among older people, and increases the load on health care systems. Periodontal disease is not limited to the oral cavity, but releases inflammatory mediators and bacteria into the bloodstream over decades. This may initiate or propagate the development of atherosclerotic plaques, leading to stroke or heart attack, and detrimentally affect blood glucose levels in pre- or diabetic states.

Do you think there is enough awareness among the public about the relationship between oral health, overall well-being and quality of life?

There is very limited awareness of the link between oral and general disease among the public; however, many health care professionals too are not aware of the association between oral and general health, even though it may significantly affect the well-being of patients. Oral health literacy education of the community and health care professionals is a

cal students is necessary to establish a holistic view of health in the future.

What is the dental community's role and that of national health care policies in this matter?

The dental community must realise that dentistry is not limited to caries and infected root surfaces; the work of the dental community should be aimed at easing a significant global disease burden and improving the health of the community. Policies must recognise oral health as an integral part of general health and health services, inseparable if the population's health is to be maintained or improved.

Do you think that there should be an increased interdisciplinary exchange between dentistry and medicine?

The exchange between dentistry, medicine and other health professions is fundamental to make substantial contributions to medical research and clinical health care in the future. A holistic view on health and disease is obviously highly relevant for clinical decision-making, since medical research has repeatedly demonstrated the interdependence of the various organ systems owing to similar generalised mechanisms.

With the rising burden of diseases such as periodontitis and diabetes on one hand and increasing awareness of prevention on the other, where does dentistry stand today?

Since the introduction of fluoridation, the dental research community and the dental profession have neglected preventative pathways for decades, and research and clinical activities have focused on restorative treatments. This trend is epitomised by the use of artificial materials like dental implants to restore natural teeth, which have to be

extracted because of the lack of adequate preventative treatment. This development is advanced by policies that reward restorative treatments and do not support preventative dental treatments.

What role does the increasing use of highly advanced and complex technology in dentistry play in achieving the goal of retaining the natural dentition for as long as possible?

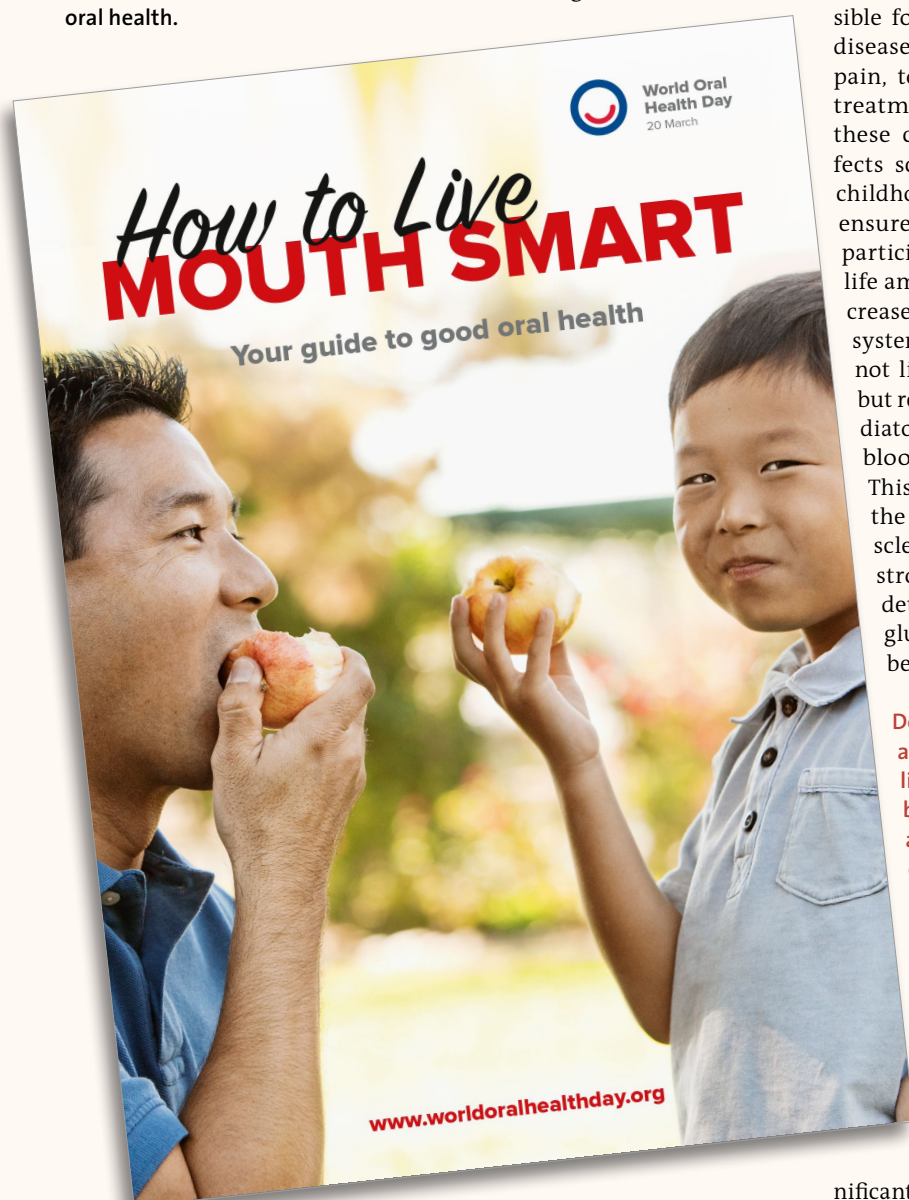
Highly advanced and complex technologies should be limited to those patients who have suffered trauma or who have severe disease or genetic deteriorations. Health care systems are not able to provide these technologies to the broader community and therefore these cost-intensive technologies are limited to the privileged. A preventative health care system is also a cost-efficient health care system, relieving individuals and the public from suffering and high costs.

In your opinion, concerning the promotion of oral health and prevention among the public, what will the main challenges to modern dentistry be in the years to come?

The main challenge in the future for health professions will be to introduce the concept of a holistic health care approach based on preventative treatments rather than on therapeutic interventions.

Thank you very much for the interview.

Editorial note: Eberhard will be holding the 2017 WOHD lecture on 20 March from 5 p.m. to 7.30 p.m. at the Australian Dental Industry Association's office in Alexandria in New South Wales. Registration for the event is open at www.wohd.com.au/register.html.



A newly released WOHD brochure with tips on how to live mouth smart for distribution in practice and clinic waiting rooms can be downloaded at www.worldoralhealthday.com.

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Koelnmesse Singapore: Mathias Kuepper assumes management position



By DTI

SINGAPORE: Having shared the management position with Michael Dreyer for an interim period since June 2016, Mathias Kuepper will now assume sole responsibility as Managing Director of Koelnmesse Pte Ltd in Singapore. The Asian subsidiary of German event organiser Koelnmesse was established under Dreyer in 2002 and organises leading dental events IDEM Singapore and the Association of Orthodontists (Singapore) Conference, among others.

Paying tribute to Dreyer's contribution to the company, Koelnmesse CEO Gerald Böse acknowledged that Dreyer helped launch and sustain a substantial part of Koelnmesse's internationalisation efforts right from the

start and ultimately ensured the success of these efforts. Furthermore, Böse said he was pleased to welcome long-standing staff member Kuepper as the new managing director of the Asia branch.

Kuepper, who is an economic geographer with extensive event and project management experience, has been working for Koelnmesse Singapore since 2002. Having been involved in the strategic business development in the Asian economic region for many years, he is set to focus on the implementation of Koelnmesse events in South East Asia and on the expansion of business activities in the local market.

With the change in staff, Koelnmesse's centralised management performed by one regional



Mathias Kuepper

centre for all of Asia will now be replaced with a market-specific decentralised organisational structure that works in close collaboration with the parent company in Cologne, the event organiser announced.

Deal collapses: Straumann decides against investing in MegaGen

By DTI

DAEGU, South Korea/BASEL, Switzerland: Global dental implant manufacturer Straumann has announced that it will no longer be pursuing its plans to invest in or partner with the South Korean implant company MegaGen Implant. Instead of converting its US\$30 million bond into MegaGen shares, the group has received full repayment in cash with interest.

In 2014, Straumann purchased convertible bonds from MegaGen and announced that it would be exercising its right to convert these bonds into shares to acquire a controlling stake in MegaGen in July last year.

After the announcement, MegaGen disputed the conversion price and calculation procedure, and despite significantly

increased offers from Straumann, initiated arbitration under the International Chamber of Commerce rules. This could have taken up to two years, depending on the progress of the arbitration.

"The collaborative spirit of partnership that characterised our relationship disappeared when MegaGen's owners initiated arbitration. This and the

corresponding long delay are not in the interest of either company and together with other recent developments make the business case unattractive," explained Straumann CEO Marco Gadola.

"Due to the urgent need to expand in the fast-growing non-premium segment in China, India, Russia and Eastern Europe, we have invested in strong part-

ners like Anthogyr, Equinox Medentika and Zinedent—in addition to Neodent. The Straumann Group brand, our shared technology platform and global network offer them considerable leverage and we are very excited about the opportunities that our partnership with them is creating. Strategically, there is no longer a compelling need for a collaboration with MegaGen," he added.

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Roland DG to establish new 3-D business brand, DGSHAPE

By DTI



HAMAMATSU, Japan: In order to increase visibility for its growing 3-D segment, Japanese manufacturer Roland DG has announced the transfer of its digital businesses, consisting of the development and sales of 3-D milling machines, 3-D printers, engraving machines and photographic impact printers, to a new, wholly-owned subsidiary, DGSHAPE Corporation. The spin-off, which begins operating in April, will be located at the Roland DG headquarters in Hamamatsu.

According to the company, its series of DWX dental milling ma-

chines has become a major driver of growth of Roland's 3-D business, accounting for 60 per cent of sales in the segment in 2016. In addition, industrial inkjet printer sales accounted for 70 per cent of digital printing business sales in the same period.

Consequently, the company decided to embark on restructuring its dentistry-focused 3-D business by launching it under the new brand of DGSHAPE and transferring it to an autonomous company.

"Spinning the 3-D business off as a separate company would allow the management of DGSHAPE to implement speedy decision-making and business execution," com-

mented Roland DG President Hidenori Fujioka on the decision to transfer the business to a new subsidiary. "Led by a young executive team—Representative Director, President and CEO Kohei Tanabe is 39 years old—I hope DGSHAPE will advance the innovative concept of 3-D digital fabrication, exploit next-generation technologies, and take bold steps to develop cutting-edge products and solutions."

In addition to Tanabe, Hisashi Bito will serve as Director and Chief Technology Officer, Kouichi Hashimoto as Outside Director, and Toru Kajikawa as Audit and Supervisory Board Member. The executive board will be formally appointed at an extraordinary general meeting in March.



Roland DG President Hidenori Fujioka

META BIOMED launches EQ-V

By DTI

HAMAMATSU, Japan: SEOUL, Korea/MÜHLHEIM, Germany: META BIOMED has now established its European headquarters in Mülheim in Germany and, with the move, the Korean medical technology company is aiming at increasing its presence throughout Europe. META BIOMED has a deserved reputation of being one of the dental industry's primary innovators, as the company's focus on research and development has achieved continual breakthroughs in the quality and performance of its medical devices and biomaterials. The focus of improvement through innovation continues with the launch of META BIOMED's new EQ-V endodontic obturation system, which promises to deliver reliable, convenient and precise root canal obturation.

The decision to base META BIOMED in Mülheim has been warmly welcomed by local economic development company Mülheim & Business and state-owned economic development agency NRW.INVEST, both of which have supported META BIOMED through-

out the expansion process. As a company with more than 1,000 employees worldwide, establishing itself in Germany is recognition of the "made in Germany" label as an international signifier of high quality. This emphasis on providing exceptional products reflects the company's own corporate ethos.

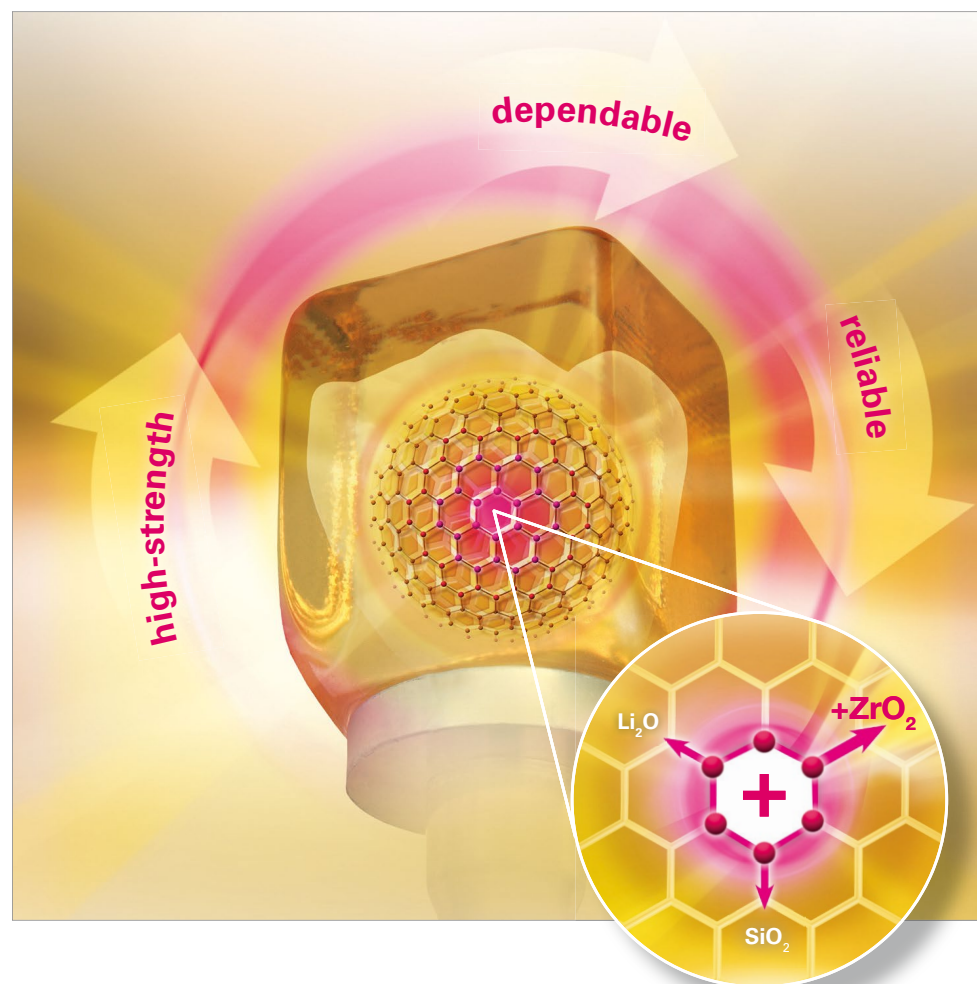
META BIOMED's EQ-V is a brand-new system that offers a revolutionary and convenient option for continuous wave obturation. With the user in mind, both the EQ-V Pack and Fill are lightweight and ergonomically designed to allow for comfortable handling. Each is protected with chemically proven housing material and offers outstanding heating performance, as the fill needs just 35 seconds to reach a temperature of 200 °C. A highly efficient and replaceable lithium battery ensures that the EQ-V has an extended battery time, making it ideal for longer and more complicated procedures. The device's unique 360° rotating cartridge provides dental professionals with unparalleled access and precision, and comes with the added benefit of being easily replaceable and disposable. All in all, the EQ-V is a product that embodies META BIOMED's commitment to providing low-cost, high-quality solutions for everyday dental procedures.

The EQ-V endodontic obturation system delivers accurate and reliable root canal obturation, and embodies META BIOMED's commitment to low-cost, high-quality dental solutions. (Photograph: META BIOMED)



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features a particularly homogeneous structure that ensures simple processing and reproducible results. And what's more, VITA SUPRINITY PC also offers the benefit of a very wide range of indications.

Next-generation laser system launched

By DTI



The BIOLASE Waterlase Express all-tissue laser system is a small, easy-to-use and cost-effective device. (Image: Business Wire)

IRVINE, Calif., USA: BIOLASE, a global leader in dental lasers, has announced that its new Waterlase Express all-tissue laser system has received 510(k) clearance for commercial distribution from the Food and Drug Administration (FDA). The product is now avail-

able for sale to dentists in the US, as well as selected international markets in Europe, the Middle East and Asia.

Waterlase Express represents the newest addition to BIOLASE's Waterlase portfolio of Er,Cr:YSGG all-tissue lasers and the fifth-generation laser of the most widely used all-tissue dental laser wavelength. Waterlase Express, which was exhibited for the first time at the Mid-winter Meeting of the Chicago Dental Society in February, will be unveiled internationally at the International Dental Show in Cologne, Germany, the world's leading trade show for the dental industry, to be held from March 21 to 25.

The system was designed based on extensive qualitative and quantitative research by a team of dentists around the world. According to BIOLASE, Waterlase Express represents the new foundation of the

company's strategy to greatly expand all-tissue laser use in dentistry.

"We are excited to launch the Waterlase Express, our next-generation Waterlase system designed for easy and intuitive operation, integrated learning, and portability. We believe the Express user interface is to legacy laser user interfaces what the Apple iPhone was to the flip phone," said Harold C. Flynn Jr., President and CEO of BIOLASE.

"Express will enable significantly higher penetration and adoption of all-tissue laser dentistry worldwide. With all the value of Waterlase technology at nearly one-quarter the size, one-third the weight, and nearly half the US retail price of our market-leading Waterlase iPlus system, we believe Express is the dental laser that is finally ready for the vast majority of dentists around the world, many of whom have waited to integrate our all-tissue laser solutions into their practices."

3Shape's new lab scanners

By DTI

CHICAGO, USA: Digital dentistry specialist 3Shape has launched a new line of cost-effective scanners for the dental laboratory. According to the company, the E scanners deliver high-quality images and offer advanced scanning features and precision CAD/CAM workflows, like other 3Shape scanners, but at a more affordable price.

The E scanners feature two 5-megapixel cameras each, Blue

LED and multiline high-speed scanning for optimal detail capture and accuracy and thus enable laboratories to complete more cases in less time. Moreover, features like 3Shape's reliable impression scanning, which allows laboratories to scan conventional impressions directly without having to pour a model, and Auto-start, which starts scanning as soon as the model is placed inside the E scanner, save additional time and costs.



3Shape's new affordable E scanners make advanced CAD/CAM accessible to laboratories of all sizes.

Planmeca intra-oral scanning systems help promote fossil research

By DTI

HELSINKI, Finland: Owing to their compact size and precision, Finnish dental manufacturer Planmeca's scanning systems have not only advanced daily dental practice in recent years, but also helped fossil research to go digital. Visiting the Finnish Museum of Natural History, the company met with prominent researchers to learn

how digital technology is used to unlock the past of fossilised teeth and bones.

Back in 2015, Prof. Jukka Jernvall, an evolutionary developmental biology researcher at the University of Helsinki, was in need of a suitable device for his latest project, researching the history of Saimaa ringed seals and the development of their teeth. For this, Jernvall was seeking a way to digitally record sets of teeth. However, the imaging tools that were available to him then were slow and their accuracy left much to be desired. Consequently, he contacted Planmeca to request the use of the company's PlanScan intra-oral scanner for his purposes.

According to Planmeca, the scanner quickly proved itself both fast and accurate, and its compact size made it easy to carry along to any research site. After this successful initial cooperation, the Planmeca Romexis software was fine-tuned at the university for research on the teeth of ringed seals.

Speaking with Planmeca Marketing Communications Specialist Sanna Tolmunen, researcher Dr Jacqueline Moustakas-Verho explained that teeth are an excellent subject for researchers of evolutionary and developmental biol-

ogy because, once the teeth have formed, they change shape only by wear. Originally from the US, Moustakas-Verho moved to Finland six years ago to study fossilised teeth. "The University of Helsinki is one of the leading institutions in the world on fossil teeth research. People come here to investigate teeth from all over the world, like France and Japan," she said.

Among the subjects examined using Planmeca's 3-D imaging devices and software so far to study prehistoric life have been the teeth of pandas, ancient cave bears and polar bears, and even the tiny teeth of mice and ancient vampire bat skulls that are so small and thin that most scanners are unable to process them.

According to the museum's senior technician, Janne Gran-

roth, most researchers who visit the museum use the Planmeca technology for their projects. "One day we hope to have systematically digitised our entire collection. Ideally, we would eventually have an online system where the serial number of every sample would correspond to a digital impression, as this would enable us to share the material with researchers all over the world."



1



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Fig. 1: Scanning cave bear teeth with the Planmeca PlanScan intra-oral scanner. Fig. 2: Dr Jacqueline Moustakas-Verho.

Madrid, Spain

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