Dental caries not genetic

By DTI

MELBOURNE, Australia: In the first large-scale study to look at the oral microbiome, researchers from Murdoch Children’s Research Institute (MCRI) have determined that an individual’s genes are not associated with the presence of bacteria responsible for dental caries. Rather, this is more greatly influenced by environmental factors like diet and oral hygiene habits.

The researchers also found that the level of inherited bacteria tended to decrease over time, whereas the bacteria associated with environmental factors increased. In light of these findings, Craig reiterated that limiting sugars and drinks, combined with a consistent oral hygiene routine, is the best way to prevent caries.

The study, titled “Host genetic control of the oral microbiome in health and disease”, was published online on 13 September in the Cell Host & Microbe journal.

School bullying

Verbal bullying at school can negatively impact an adolescent’s mental health, causing distress and anxiety. A Brazilian case-control study has now shown that this stress may be reflected in oral health too and possibly result in nocturnal bruxism. The cases were composed of 103 school pupils between the ages of 14 and 15 with possible sleep bruxism (i.e. self- or parent-reported) and the controls of 206 adolescents without possible sleep bruxism.

Among the participants, 154 (45.5 per cent) reported involvement in verbal school bullying episodes as a victim, perpetrator or both. The vast majority (90.3 per cent) of them were males. Overall, these teenagers recorded a higher frequency of bad teeth and developing incisors that are more greatly influenced by environmental factors than genetic ones, the results of a new study have suggested.

Sydney to host FDI 2021

The Australian Dental Association (ADA) has announced that the FDI World Dental Congress will be held in Sydney in September 2021. “It is proof that Australia occupies an enviable place at the forefront of world dentistry and that this has, once again, been recognised by leading figures in the world of dentistry,” ADA President Dr Hugo Sachs said.

Tweaking study results

Researchers from Australia have found that more than a quarter of biomedical scientific papers may utilise practices that distort the interpretation of results or mislead readers—a practice known as “spin”. The highest, but also greatest, variability in the prevalence of spin was present in the clinical trials included in the review.

The presence of bacteria in the oral microbiome associated with dental caries is influenced more by environmental factors than genetic ones, the results of a new study have suggested.

Prevention first

BRISBANE, Australia: A recent article, published in the British Dental Journal, has recommended a maximum intervention approach involving all members of the healthcare team and promoting evidence-based self-care, taking into account salivary, plaque and lifestyle risk factors.

According to an article author Prof. Laurence James Walsh, from the University of Queensland, dental professionals must be prepared for the sheer number of older patients, retaining their natural teeth for longer. “A central tenet of modern preventive dentistry is to avoid intervening before prevention has been given a chance to work,” emphasised Walsh.

“Protocols for oral care must be tailored to the patient’s needs and be realistic given the limitations in time, finance and energy which can be expended.” Particular problems include root surface caries in patients with a strong history of caries and those who suddenly develop salivary hypofunction. Furthermore, elderly patients suffer from more chronic diseases.
First-ever robot-led dental surgery performed in China

By DTI

XI’AN, China: For the first time ever, a robot has independently placed two 3-D-printed implants into a patient’s mouth without human involvement. The successful procedure raises hopes of lessening Asia’s dentist shortage, especially prevalent in metropolises such as Hong Kong and Singapore, and of avoiding risks posed by poor-quality surgeries performed by unqualified dentists.

After taking a CT scan to acquire data on the female patient’s skull and jaw, the medical staff fitted position orientation equipment to the woman and determined the movements, angle and depth needed to fit the implants in her mouth so that the robot could be programmed to move into the correct position to carry out the operation. According to Prof. Zhao Yimin, a surgeon from the Fourth Military Medical University (FMMU) in Xi’an, the procedure went very smoothly and the implants were placed with high precision.

Although human staff were present at all times during the 1-hour surgery, they did not play an active role. The robot, which was jointly developed by the Beihang University in Beijing in China and FMMU’s Stomatological Hospital over the last four years, is designed to follow a set of preprogrammed commands, but it is able to make adjustments during surgery. The China Morning Post reported according to a recent survey, about 400 million patients are in need of dental implants in China. However, the number of qualified dentists in the country is insufficient to meet the increasing demand. Through a continuing implementation of robot technology, this shortage may be eased.

In the future, robot-assisted and led technology could increasingly facilitate dental surgeons’ work, experts have predicted. Robotic technology has already been introduced in recent years to assist in dental procedures such as root canal therapy, orthodontic operations and implant placements. In March this year, a pioneering robotic guidance system, YOMI, received clearance from the U.S. Food and Drug Administration. The computerised navigational system delivers physical guidance through the use of haptic robotic technology, which provides sensory feedback and constrains the drill in position, orientation and depth, the device’s manufacturer, Neocis, stated.

Inaugural IDEC impresses with strong international presence

By DTI

JAKARTA, Indonesia: With 293 exhibiting brands and businesses and more than 4,000 visitors, the inaugural event of the Indonesia Dental Exhibition and Conference (IDEC) proved an all-round success. In addition to a high-quality scientific programme, the industry show especially was fruitful in presenting international companies with the unique opportunity to gain a foothold in the emerging Indonesian dental market.

“By leveraging on Koelnmesse’s extensive sales network in over 100 countries around the world and by working together with our counterparts in Indonesia, we’ve turned IDEC into a platform for both international and local companies to come together and explore new business partnerships,” explained Mathias Kuepper, Managing Director of Koelnmesse Pte Ltd in Singapore.

Of the 293 exhibitors, 81 per cent were from overseas, according to the organisers. Furthermore, featuring five national pavilions (Germany, Italy, South Korea, Switzerland and China), the exhibition was one of the first dental trade fairs in Indonesia to achieve such a strong international presence.

“IDEC 2017 has been successful in gaining the full support from the government as well as key stakeholders in the industry and we hope to continue this momentum into IDEC 2019,” commented Bambang Setiawan, President Director of Traya Eksibisi Internasional. “We see a great opportunity for IDEC to become the central dental event for dental professionals in Indonesia.”

IDEC 2017 was held from 15 to 17 September under the theme “Modern science and technology for the future of Indonesian dentistry.” According to event chairperson Dr Dino Suaso, the scientific programme was designed to cover as many aspects of dentistry as possible and aimed at inspiring attendees to provide patients with a better standard of dental care.

The event, which was jointly organised by the Indonesian association (Persatuan Dokter Gigi Indonesia), Koelnmesse Pte Ltd and Traya Eksibisi Internasional, will return to Jakarta in 2019, alternating with IDEC Singapore. Further information can be obtained at www.indonesiadenalexpo.com.
Newly created protein may be promising for anti-caries vaccine

By DTI

WUHAN, China: Researchers from the Wuhan Institute of Virology at the Chinese Academy of Sciences have created a fusion protein (formed through the joining of genes that originally coded for separate proteins) that might be the key to developing a vaccine against dental caries. According to the research team, their second-generation fusion protein provides high protective efficacy against caries, but with lower side-effects than with previously created proteins.

The research, which was supported by grants from the National Natural Science Foundation of China and the German Research Foundation, is an advancement on previous studies on the fusion protein KF-rPAc. While KF-rPAc provided prophylactic and therapeutic efficiency against caries, it also demonstrated possible side-effects, such as high antigenicity and potential inflammatory injury, that restricted its clinical usage.

Aiming to avoid these drawbacks, the researchers created KFD2-rPAc, which induced fewer systemic inflammatory responses in animal trials, among other effects. Although there is still a long way to go until a vaccine for use in humans will be available, the characteristics of KFD2-rPAc make the protein a promising vaccine candidate against dental caries, the researchers concluded.

The results were published in a paper titled “Second-generation flagellin-rPAc fusion protein, KFD2-rPAc, shows high protective efficacy against dental caries with low potential side effects” on 11 September in the Scientific Reports journal.

Chinese researchers have created a fusion protein that could be key for developing an anti-caries vaccine in the future.
“The value of a cavity-free future”

By Kristin Hübner, DTI

The annual summit of the Alliance for a Cavity-Free Future (ACFF) just took place at the FDI World Dental Congress in Madrid in Spain. At the event, Dental Tribune had the opportunity to sit down with ACFF Chairman Prof. Nigel Pitts from King’s College London in the UK to speak about the efficiency of measures such as sugar taxes, the recent ACFF-led Policy Lab meeting and the importance of appropriately communicating the economic value of a cavity-free future to policymakers.

Prof. Pitts, could you please briefly introduce ACFF and what the organisation does?

ACFF is a non-profit charity set up seven years ago to bring together different groups around the world to stop cavities now. It was born out of a group of people working in caries treatment and prevention who had become frustrated that not enough was being done to stop cavities, despite this being the goal of many groups, associations and dental bodies. We therefore formed an expert panel to give guidance on integrated clinical and public health action to stop cavities initiation and progression and have people from all around the world meet each year with the aim of moving collectively towards a cavity-free future. However, we are very much aware that, if change is going to happen, it has to happen locally. Which is why we now have 26 chapters around the world who work locally in bringing together different role-players in dentistry and linking them with public health bodies, government and policymakers, basically anybody who has an interest in stopping cavities and the ability to help do so.

In September, ACFF met for the eighth time. How far has the organisation come?

We started with an idea. Now, we have 26 chapters and websites that are seen by the wider health professionals, public health nurses. Therefore, that by itself is very powerful opportunity when involving family and parents even before the child is born. There is a very powerful opportunity when pregnant mothers are aware and looking out for things to do for their unborn child. From that point right through life, we should be joining up—public, patients and dentistry alike.

Children are often not seen by a dentist until later on, but they are seen by paediatricians and public health nurses. Therefore, the wider health professionals have to get the message as well. And, thirdly, it’s not just about oral hygiene and fluoride; it’s about diet. Diet and sugar consumption play a big part in what drives the carious process. If we can get people to reduce their sugar intake and at the same time make them more aware and get them to keep their mouths cleaner and use fluoride regularly, that combination could make the difference.

How useful are public health initiatives in this regard?

They are an important part of the picture and the puzzle. Because of the way the disease starts and progresses, one can’t say this or that is the answer. Public health is an important part, but by itself it can’t do it. It helps catch children who, either for financial or social reasons, will not receive the benefits otherwise. In this regard, it is very important for the minority group of children who have most of the disease.

The causes of cavies are complex, but sugar seems to play a big part in it. The phrase that is used a lot is ‘sugar is the new tobacco’. It takes us to the important link between risk factors for cavities—sugar is a big risk factor—but also for diabetes and metabolic syndrome and obesity. Many governments are now trying to improve health, but also look at the economic consequences. By reducing sugar, we can improve tooth decay, obesity, diabetes and cardiovascular health. That makes it much better for society, but also for governments.

Do you feel that the sugar tax has already been successful in initiating this process?

Yes, because seen the debate has started to change attitudes, and the sugar industry has already responded and is trying very hard to say that a voluntary change is fine and we don’t need a tax.
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To learn more about the conference visit: www.mis-implants.com/bahamas

INSPIRING SPEAKERS. BREATHTAKING VIEWS
MAKE IT SIMPLE
How do we accelerate a policy shift towards increased resource allocation for caries prevention and control?

The problem

Caries shares risk factors with other non-communicable diseases such as obesity, diabetes and metabolic syndrome. It is vital to balance the risk factors with protective factors.

The policy lab (28-29 June 2017)

We found that a cavity-free world is achievable and many countries have taken steps to get there. Caries is not distributed evenly across populations, and there are two contrasting target groups when dealing with this issue:

- Those excluded groups without access to care
- Those with access to types of care which may no longer be appropriate.

We do not need more evidence to show that preventing cavities is possible

So why are we not there yet?

We have still not demonstrated to policymakers why a cavity-free future is worth it.

To compete with other political and policy priorities, we need comprehensive economic analyses to demonstrate the value of action on cavities.

Help us accelerate progress towards a cavity-free world

Learning from current global experiences and developments, we must:

- Demonstrate the value of a cavity-free world to: professionals, the public and policymakers
- Create prevention-based payment systems
- Better equip the dental and healthcare workforce
- Shift public and industry behaviours

to deliver more rapid progress

What exactly are the problems with the system?

Decayed teeth are filled or extracted, but we are not dealing with the cause of the caries. The focus is only on treating late-stage disease. One way of describing the problem is that, for many years, we have been repainting the house while the house is on fire. It is better to put the fire out before repainting the house.

What were the outcomes of the Policy Lab debates?

The discussion found that—looking at the evidence—moving towards a cavity-free world will be achievable, and many countries have already done a lot to get there, but we are not there yet. We are not yet moving fast enough with this shift, because dentistry, economics and public health have failed to demonstrate the value of that to policymakers. We haven’t had this discussion in the right language with the policymakers.

Speaking of economic factors, it seems that, in dentistry, preventative measures are not as financially rewarding as other treatment options.

Exactly! That is why we have been talking in the Policy Lab. Because the payment system hasn’t kept up to date with best practice, there is a disconnect between what dentists should do and how they are paid—and it is time that is changed. Preventative dentistry shouldn’t be financially disadvantagous to dentists. Instead, they should be rewarded for doing the right thing.

How can this progress be accelerated?

In order to increase resource allocation for prevention and control, there are four main things that were decided to be focused on. First is demonstrating the value—the benefits as well as the costs—of a cavity-free future. The second is creating prevention-based payment systems. The third is better equipping the dental and wider dental health workforce to provide cutting edge prevention. We know a lot about the technical side of dentistry, but not how to best use the latest technology and psychological interventions to persuade people to eat less sugar and adopt appropriate oral health behaviour. And lastly, we need to shift public and industry behaviours.

We feel that the Policy Lab was a breakthrough moment. We had representatives of many key stakeholders in the room at the same time, and they have now agreed on the agenda. The FDI World Dental Federation has rightly been saying we should move in this direction since 2000. Seventeen years on we still have a long way to go, we can now, however, accelerate this process by working together across stakeholders and including the economic dimension.

Thank you very much for the interview.
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Modern Dental CEO awarded HKU honorary fellowship

By DTI

HONG KONG: Godfrey Ngai, co-founder and CEO of dental prosthetic provider Modern Dental Group (MDL), was granted an Honorary University Fellowship by the University of Hong Kong (HKU) and is the first recipient of this award in the dental profession. The recognition honours Ngai’s long-standing commitment to the university, as well as his efforts at societal upliftment through donating MDL dental products and services to schools, healthcare organisations for the elderly and other sections of the community in need.

Over the past two decades, Ngai has supported HKU’s Faculty of Dentistry in postgraduate teaching and the advancement of dental technology by means of collaborative research with MDL, the university stated. For example, MDL was instrumental in supporting the establishment of HKU’s Modern Dental Laboratory Endowed Professorship in Clinical Dental Science in 2011. In 2012, with the faculty, the company co-hosted the World Dental Forum, which brought together leading dental scientists and researchers from around the globe.

“I am honoured that my devotion and contributions have been recognised. During my 19 years of teaching dental technology, I have trained hundreds of young dentists and dental technologists who went on to become the backbone of dental services in contemporary Hong Kong,” Ngai commented on the achievement.

Apart from his contribution to HKU, Ngai has led MDL’s pro-active engagement in other societal services. For example, under Ngai, the Hong Kong-based company has extended its services to mainland China, training thousands of dental technicians and driving the development of the dental laboratory industry in China.

“It is always our mission to contribute towards society and going forward I will continue to lead MDL, as well as the public company Modern Dental Group, to carry out more good deeds in order to create value for our society,” Ngai remarked in this regard.

As a leading global provider of dental prostheses, MDL focuses on custom-made prostheses in the growing prosthetic industry. Its product portfolio consists of three main lines: fixed prostheses, removable prostheses and other devices, such as orthodontic appliances, sports guards and anti-snoring devices.

Interactive online learning series

By DTI

LEIPZIG, Germany: In 2018, Dental Tribune International (DTI) is launching its online educational platform, Dental Tribune Online Shows. Consisting of a series of educational lectures on all dental specialties, including aesthetic dentistry, digital dentistry, endodontics, implantology, laser dentistry, orthodontics, periodontics and preventive dentistry, the shows are designed to be of immense value for dental professionals around the globe and are free to attend.

The unique concept will allow dental professionals insights into the latest studies and case reports as well as gaining first-hand experiences from top international experts. Lectures are designed to be convenient in style and use and participants will be able to access them from anywhere in the world, free of charge. Additionally, interaction with the dedicated experts via the question-and-answer sessions at the end of each presentation offers a chance to dig deeper into an area of interest—all the while receiving credits from an ADA CERP-recognized provider.

Lectures will be presented on a dedicated website and cover two full consecutive days (Friday and Saturday, 9 a.m. – 8.30 p.m.) with ten 60-minute presentations per day. Each lecture will be recorded, edited and archived on the respective show’s website to allow for later access.

The DT Online Shows calendar and corresponding websites can be viewed at www.digitaldentistshow.com.

IDM oral health award presented

By DTI

MADRID, Spain: Prof. Mahesh Verma, President of the Indian Academy of Restorative Dentistry, was presented with the second annual International Dental Manufacturers (IDM) Global Oral Health Progress Award at the FDI World Dental Congress in Madrid on 30 August. The award recognizes Verma’s many years of service to the dental profession and valuable contributions to furthering global oral health, particularly in emerging markets.

“Dr Verma’s visionary dedication to raising the standards of oral healthcare in India has culminated in his long-time leadership of the widely renowned Maulana Azad Institute of Dental Sciences,” said IDM President Dr Kiyotaka Nakao. “Under his leadership, its worldwide affiliations have set a benchmark in dental education and dental care.”

The annual IDM Global Oral Health Progress Award provides a donation in the recipient’s honour to the charity of his or her choice.

Verma, who is Principal of the Maulana Azad Institute of Dental Sciences, serves in numerous global oral health positions. Among others, he is a member of the Global Child Dental Health Task Force in the UK, Chairperson of the Research Committee for Dental Sciences at the Indian Council of Medical Research, and President of the International Association for Disability and Oral Health India Chapter.

Founded in 1988 in Washington, DC, the US, IDM is an umbrella organisation that globally represents the common interests of its member associations. Through them, IDM supports the interests of the global dental industry and trade as a whole.
New plant to strengthen GC’s dental pharmaceutical business

By DTI

KAWASAKI, Japan: After acquiring all ordinary shares of dental pharmaceutical product manufacturer Showa Yakuhin Kako in autumn last year, GC has now announced that it is building a new manufacturing facility in Kawasaki to further expand its dental pharmaceutical business. According to the company, construction of the new factory will start in January next year, with completion expected in May 2019.

The new three-storey facility is planned to have a total floor area of 5,518 m². Its design and construction have been commissioned to Chiyoda Technos, a company with a long history of and experience in building of medical product manufacturing plants, GC announced.

In line with GC’s global Communication Loop concept, a commitment to improving communication and the exchange of knowledge among employees, the new facility will be designed with open spaces that aim to foster interaction. “Inspiration is born where people are engaged in conversation, and within the space of a creative setting, shared experiences and emotions help to promote mutual understanding. GC sees a large amount of new power emanating from this understanding,” commented the company on its philosophy.

Showa Yakuhin Kako is one of Japan’s leading dental pharmaceutical manufacturers and known for its range of local anaesthetics and medication for treating periodontal disease. Building on the synergistic effects of combining both companies’ respective fields of expertise, the new facility is part of GC’s efforts to achieve its goal for its 100th anniversary in 2021: to become the top dental company in the world through making further contributions towards a healthy, long-living society.

Top speakers, top entertainment: Dentsply Sirona World 2017 breaks records

By DTI

LAS VEGAS, USA: In September, Dentsply Sirona World 2017 attracted more than 7,000 dental professionals to Las Vegas. Featuring presentations by world-famous experts, peer discussions and a trade show, the meeting also offered an extraordinary entertainment programme. Highlights were appearances by award-winning actor Will Smith, who shared his tips for personal success, as well as American ventriloquist and comedian Jeff Dunham, and Grammy-winning local band Imagine Dragons.

“We are delighted that so many dental professionals, dealers, business partners and practice teams joined us here in Las Vegas for the industry’s greatest educational festival. Dentsply Sirona World is the perfect platform for an exchange of professional ideas and expanding your network. Our aim is to further advance dentistry through better, safer and faster processes, while fueling people’s appetite for new technologies,” commented Michael Augins, Group Senior Vice President of Dentsply Sirona’s US Commercial Organisation, on the successful show.

According to the organiser, one of the main goals of the meeting was to inspire attending dental professionals to be the best dentists they can be. With more than 110 leading experts from the dental industry contributing to the comprehensive educational programme, the event offered a vast selection of workshops and breakout sessions to choose from.

Altogether, the programme covered 11 areas of interest: business and practice management, CEREC, endodontics, imaging, implantology, office design, orthodontics, periodontics and hygiene, prosthetics and lab, restoration, and special markets and topics. Attendees could customise their experience by attending sessions within one track for specialised training or from a variety of tracks for a well-rounded experience.

Fig. 1: Michael Augins, Group Senior Vice President of the US Commercial Organisation, welcoming attendees to Dentsply Sirona World. The meeting took place from 14 to 16 September at the Venetian hotel in Las Vegas.
Fig. 2: More than 7,000 dental professionals attended the meeting.
Combating pregnancy gingivitis: EFP and Oral-B launch joint campaign

By DTI

MADRID, Spain: At this year’s FDI World Dental Congress in Madrid, long-standing partners Oral-B and the European Federation of Periodontology (EFP) announced that they have joined forces in a Europe-wide campaign to raise awareness of the importance of oral health during pregnancy. The initiative aims to educate and support expectant women, as well as health-care and dental professionals, by introducing guidelines for both audiences, among other measures.

Owing to hormonal changes, pregnant women have a higher risk of developing periodontal disease—a link that has been well established through research. However, according to a new US study, gingivitis affects far more pregnant women than previously thought, its occurrence and severity substantially exceeding US national averages.

Presenting the findings of the Oral Hygiene and Maternity Outcomes Multicenter Study, Dr Robert Gerlach, a research fellow in clinical investigations at P&B, which supported the research, said that moderate-to-severe gingivitis was very common among the 648 women evaluated. The study found a substantial disease onset across broad demographic and socio-economic subgroups beginning in the first trimester of pregnancy. Moreover, severity was extraordinarily high, averaging 31 bleeding sites, which represents nearly one-third of the gingiva.

Highlighting the fact that gingivitis is a preventable and manageable disease, Gerlach said it should be every expecting mother’s priority to avoid excessive plaque accumulation to prevent gingivitis becoming an issue. He stressed that many pregnant women, especially in their first pregnancy, are willing to seek advice and will actively change their behaviour, which is why this is an optimal time to reach them in raising awareness of the risk.

Supporting the educational purpose of the campaign, four reports are being published. The reports should cover all aspects of women's oral health during pregnancy. Furthermore, they highlight the mechanisms of pregnancy gingivitis, and cover treatment options and their effects on expectant mothers' health and that of their children.

“We want to have an impact,” said Prof Mariano Sanz, Chairman of the EFP Workshop Committee. “We believe that the mission of the EFP without the power of our partners—in this case Oral-B—would not be efficient, so partnership is key!”

Giving a preview on the new guidelines, Sanz remarked that the FDI World Dental Congress is the perfect platform by which to reach dental professionals worldwide, since the federation represents the unified voice of the dental industry.

More information about the campaign, its tools, guidelines and the reports are available at the newly launched website, www.oralhealthandpregnancy.efp.org.

Fourth MIS Global Conference takes implant community to Bahamas

By DTI

BAR-LEV INDUSTRIAL PARK, Israel: The next MIS Global Conference will take place from 8 to 11 February in the beautiful Atlantis Resort in the Bahamas. One of the highlights of the event will be a series of TEDxMIS discussions, an independently organised TED event that will feature world-leading thinkers and achievers in the field of implant dentistry.

After the tremendous success of the last MIS Global Conference in Barcelona, with its fascinating scientific programme, high-level lectures and impressive social events, the next edition too promises to deliver an intense and unforgettable experience in every respect. MIS Implants Technologies has announced its partnership with TEDx.

The scientific committee, headed by Prof Lior Shapira, Chairman of the Department of Periodontics at the Hebrew University—Hadassah Faculty of Dental Medicine in Jerusalem in Israel, has undertaken the mission of making this year’s conference particularly worthwhile. The scientific programme is aimed at addressing contemporary treatment possibilities and providing insight into the present and future of dental implants as part of clinical dentistry. “The podium will be occupied by high-quality clinicians, researchers, and educators—who will share with you their extraordinary experience and clinical excellence,” Shapira said.

With the official launch of the V3 implant system in the US currently underway, MIS is devoted to bringing the dental world the latest innovations and is committed to helping clinicians improve patient care. At the conference, various workshops will provide an opportunity for meaningful learning in an intimate environment, with accomplished experts in specific areas of interest.

The two-day main programme will feature eminent speakers presenting their expertise for potential translation into everyday practice. Among the topics to be addressed are evolution and horizons in implant therapy, biological principles and predictable aesthetics, long-term forecast for implant therapy and going digital.

TEDxMIS

In the spirit of “ideashot spreading” and a commitment to innovation, MIS has further announced its partnership with TEDx. TEDxMIS is an independently organised TED event that will take place on 10 February and feature world-leading thinkers and achievers in the field of implant dentistry. The goal of the TEDx discussion is to give conference guests the opportunity to experience a unique series of fast-paced, eye-opening talks that will inspire them and provoke meaningful engagement with their peers.

As part of its commitment to promoting young clinicians, MIS is continuing the tradition of holding a clinical case competition during the global conference, with this year’s focus on modern technologies and techniques in clinical practice. The best 15 clinical cases will be presented as posters at the conference venue and prizes awarded to the three winning cases.

Breath-taking views and spectacular entertainment

As in past events, this conference is expected to provide an extraordinary environment for knowledge sharing and the opportunity to meet with peers in the international dental community. This year, however, conference attendees will also enjoy one of the most beautiful and exotic locations in the Atlantic Ocean: the Atlantis Resort on Paradise Island. When they are not engaged in workshops and lectures, guests will be able to take in the marine habitat, sports activities, culture and colours of the Bahamas. Full of impressive and fun events, the MIS Global Conference entertainment programme will leave guests with fond memories and looking forward to the next gathering, the company stated.
At the forefront of dental science

An interview with Prof. Ryutaro Kamijo, Chairman of the organising committee of the 65th meeting of the Japanese Association for Dental Research in Tokyo

By DTI

On 18 and 19 November, fascinating Tokyo will play host to the 65th annual meeting of the Japanese Association for Dental Research (JADR). Ahead of the event, Dental Tribune had the opportunity to speak with event chairman Prof. Ryutaro Kamijo about this year’s theme, highlights of the scientific programme and progress in dentistry.

What is the focus of this year’s event?

The main theme of this congress is “Forefront of dental science—Toward a global standard in medical science”. IADR has promoted a wide variety of specific studies related to dental medicine and played important roles in this field, including the provision of a gateway to global development of dental science in Japan. In addition, the members of JADR have made primary contributions to the remarkable progress in dentistry that we have seen throughout the world. To further advance dental studies in the future, innovation and interdisciplinary communication are needed to fully understand, share and discuss important problems and provide solutions. Therefore, the theme of this meeting was chosen to further spur a worldwide evolution in dentistry.

The official congress language will again be English—quite unusual for a regional congress. What was this decision based on?

IADR decided that the official language of its congresses would be English many years ago. As a division of the International Association for Dental Research (IADR), one of the most important issues for IADR is to serve as an excellent medium for international exchange in dental research. For this purpose, the official language of the congress should be English.

Overall, how many visitors do you expect?

Since the early registration deadline has not yet passed, it is difficult to predict participant numbers for this congress. We currently expect about 450 national and international visitors.

What did you aim at when composing the scientific programme—are there any trending topics that you wanted to address with the choice of lectures?

We have invited Prof. Angus William G. Walls (IADR), Dr Harry-Sam Selikowitz (FDI World Dental Federation) and Prof. Irma Thesleff (University of Helsinki) as special lecturers, and they will be sharing with us their future outlook with regard to dental science.

As for the keynote address, Prof. Kazutoshi Mori from Kyoto University will be presenting an interesting lecture titled “Dynamism of function and regulation of the endoplasmic reticulum.”

We are also holding three symposia on three particular topics, titled “Cutting-edge etiology of periodontitis: Next sights for host–parasite interaction”, “Life science in space—Biomedical research performed in the international space station” and “Advances in iPS cell research and its application to dental medicine”, as we see them as addressing vital issues faced by dental researchers throughout the world.

Where do you anticipate key developments that will significantly shape the dental profession in the years to come?

If I had to name three areas that I think will see major shifts, these would be regenerative dentistry, dental materials and CAD/CAM dentistry.

Apart from the scientific input, what can attendees look forward to at the congress?

We are hosting a reception on Saturday, 18 November, at the Tower Restaurant in the Showa University Hospital. And, of course, there is Tokyo: Japan’s capital city is a mix of ultra-modern skyscrapers and traditional historical tourist attractions, which—I hope—all attendees will be able to enjoy in November.

Thank you very much for the interview.

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A working document for the production of a milled zirconium dioxide framework

By Dr Octavian Fagaras & Milos Miladinov, Romania

When veneering zirconium dioxide frameworks, manual dexterity and a profound knowledge of the materials is required. The correct use of the materials is decisive for success. A screw-retained and therefore conditionally removable restoration is a proven concept for the implant prosthetic treatment of an edentulous maxilla. Zirconium dioxide is a framework material that can support a long-lasting result. A state-of-the-art zirconium dioxide material such as Zenostar T (Wieland Dental) and innovative ceramic veneering systems (such as IPS e.max ZirLiner, Ivoclar Vivadent) enable natural-looking prosthetic restorations to be achieved in an efficient manner. In principle, zirconium dioxide is a sophisticated material that requires correct and skilled application.

Introduction to a patient case

An implant-supported, screw-retained bridge was planned for the edentulous maxilla. Based on defined backward planning, six implants were inserted into the patient’s jaw. After the healing phase, the implants in the visible region were provided with transversal screw-retained abutments. In the molar region, the final bridge restoration would be occlusally screw-retained.

Important parameter for framework production

A set-up of the planned restoration was used as a basis for the CAD/CAM-supported production (Zenotec, Wieland Dental) of the zirconium dioxide framework. After digitisation in the design software, the framework shape was reduced according to the cut-back technique. This method created sufficient space for the veneering ceramic to be applied in an even thickness. This ensures a balanced temperature distribution in the bonding area between the framework and the veneer.

Preparing for veneering

The next working steps require not only manual dexterity but also knowledge of the material firing parameters and furnace settings. This is the only way to ensure a balanced temperature distribution in the bonding area between the framework and the veneer. This in turn results in a sound bond and uniform shrinkage of the ceramic layer. Slow cooling of the restoration prevents the risk of tension in the fired restoration, which therefore minimises the risk of delamination. The exact fit of the restoration justifies the long firing time.

It should be noted that the programmes must be adjusted accordingly before the first ZirLiner bake (IPS e max Ceram ZirLiner, Ivoclar Vivadent):
- long heating-up time
- long cooling-down time

Ceramic system and framework

Our preferred veneering material (IPS e max Ceram) consists of low-fusing nano-fluorapatite. The material has a crystal structure similar to that of natural dentine and allows a specifically adjustable combination of translucency, brightness and opalescence. The framework (Zenostar T) is an ideal base for the ceramic veneer. The defined cut-back enables the framework to be veneered efficiently. The reduced tooth shape allows the veneering ceramic to be applied in an even thickness. This ensures that the layered ceramic is heated uniformly during firing. For the fabrication of the prosthetic gingiva, we chose IPS e max Ceram Gingiva materials, with which we achieved a gingival area with a lifelike appearance.

Fig. 1. The structure milled in wax to check the fit.
Fig. 2. The framework was fabricated using zirconium dioxide (Zenostar)...
Fig. 3. Sintering the framework. Small sintering drops supported the framework during sintering.
Fig. 4. Checking the fit of the titanium sleeves after sintering.
Fig. 5. Comparison between the wax structure and the sintered framework.
Fig. 6. The fired framework with IPS e max Ceram ZirLiner ready for veneering.

...when dealing with a complex restoration on a zirconium dioxide framework, correct handling is a major criterion for success.
short drying time, it can be fired (Fig. 6).

The furnace settings have to be modified:

<table>
<thead>
<tr>
<th>Start temp</th>
<th>Drying time</th>
<th>Temp. increase</th>
<th>End temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>403 °C</td>
<td>8 min</td>
<td>25 °C/min</td>
<td>960 °C</td>
</tr>
<tr>
<td>Holding time</td>
<td>1 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum</td>
<td>450–959 °C</td>
<td></td>
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Wash bake

Owing to the low thermal conductivity of zirconium dioxide, the wash bake is indispensable. The veneering ceramic sinters directly on to the framework surface, and a homogeneous bond to the fired ZirLiner is achieved. First, a wash bake was carried out in the pink aesthetic zone. The restoration was placed on to a firing tray and then fired (Fig. 7). Then the IPS e.max Ceram Transpa clear wash bake was carried out.

The recommended firing programme for the wash bake:

<table>
<thead>
<tr>
<th>Start temp</th>
<th>Drying time</th>
<th>Temp. increase</th>
<th>End temp.</th>
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</thead>
<tbody>
<tr>
<td>403 °C</td>
<td>8 min</td>
<td>25 °C/min</td>
<td>750 °C</td>
</tr>
<tr>
<td>Holding time</td>
<td>1 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum</td>
<td>450–749 °C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Individual build-up of the white aesthetics

The basic tooth shade for this restoration was A2. In order to achieve a unique and characteristic result, we individualised the ceramic materials and used other effects, such as Deep Dentin and Impulse, Intensive and opalescent materials (Fig. 8). We built up the ceramic on the prepared framework according to the layering diagram (Fig. 9), using Build-up Liquids to mix the IPS e.max Ceram. We worked as closely as possible to the final tooth shape (Figs. 10 & 11) and then fired the restoration.

The recommended firing programme for the first dentine bake:

<table>
<thead>
<tr>
<th>Start temp</th>
<th>Drying time</th>
<th>Temp. increase</th>
<th>End temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>403 °C</td>
<td>8 min</td>
<td>25 °C/min</td>
<td>450–749 °C</td>
</tr>
<tr>
<td>Holding time</td>
<td>1 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum</td>
<td>450–749 °C</td>
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</table>

After firing, the bridge was trimmed and cleaned. This is ideally carried out in an ultrasound water bath or using a steam cleaner. The shape was then completed using ceramic and a second dentine bake was carried out. The firing parameters were based on the first dentine bake.

Individual build-up of the pink aesthetics

There are 13 IPS e.max Ceram shades available for the prosthetic gingiva design. With this variety, it is possible to almost playfully recreate the gingiva. The system’s shade guide aids in finding the correct shade. A natural reproduction is based on the anatomical prerequisites. For example, the keratinised gingiva is recreated with light pink materials, as the blood circulation is naturally less in this area, whereas the mucogingival area is imitated using more intensive materials (Fig. 12). With some skill, a 3-D gingiva design is produced and then the bridge is fired. Again, the firing parameters are adjusted and the temperature is lowered slightly. The presented case was also produced in this manner.

The recommended firing programme for the first gingiva bake:

<table>
<thead>
<tr>
<th>Start temp</th>
<th>Drying time</th>
<th>Temp. increase</th>
<th>End temp.</th>
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<tbody>
<tr>
<td>403 °C</td>
<td>8 min</td>
<td>25 °C/min</td>
<td>745 °C</td>
</tr>
<tr>
<td>Holding time</td>
<td>1 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum</td>
<td>450–744 °C</td>
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For the second gingiva bake, the shape was completed and the furnace temperature lowered again by 5 °C (Fig. 13). After this bake, the restoration had a distinct 3-D shape and a very natural appearance. The teeth had a good depth of colour and a warm translucency.

Fig. 7: Preparing for the wash bake. Both the gingival and the tooth areas were covered with the relevant materials.—Fig. 8: Selection of the required dentine materials (IPS e.max Ceram) —Fig. 9: The framework prepared for the first build-up layer.—Figs. 10a & b: The ceramic build-up was based on the specified layering diagram.—Figs. 11a & b: The framework before and after the first dentine bake.—Figs. 12a & b: The veneered prosthetic gingiva. A 3-D design was fabricated and various materials of different colours were used.
While finishing the restoration, full attention was paid to the texture and morphology. The harmonious interchange of raised and depressed areas gave rise to natural-looking reflections. In addition to the edges and curves, the effect of finely detailed structures is not to be underestimated (microstructure). We therefore intentionally introduced slight irregularities in order to produce a certain liveliness. Finally, the restoration was finished with a rubber polisher and then glaze fired (without glaze material). We achieved the required gloss level by manual polishing (Figs. 14 & 15).

The recommended firing programme for the glaze bake:

<table>
<thead>
<tr>
<th>Start temp</th>
<th>Drying time</th>
<th>Temp. increase</th>
<th>End temp.</th>
<th>Holding time</th>
<th>Vacuum</th>
</tr>
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<tbody>
<tr>
<td>403 °C</td>
<td>6 min</td>
<td>60 °C/min</td>
<td>725 °C</td>
<td>1 min</td>
<td>450–749 °C</td>
</tr>
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Conclusion

In dental technology, manual skills and optimal materials are essential, but also a profound knowledge of materials science and material-specific characteristics is of fundamental value. In particular, when dealing with a complex restoration on a zirconium dioxide framework, correct handling is a major criterion for success. In the case presented, the framework (Zenostar T) and the ceramic veneer (IPS e.max Ceram) successfully harmonised with one another, creating a vibrant interplay of colours. Owing to accurately selected firing parameters, no delamination or late cracks are to be expected.
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Charcoal-based dentifrices under review

By DTI

DUBAI, UAE: For dental professionals wanting to learn about the latest in cosmetic and aesthetic dentistry, the ninth edition of the Dental Facial Cosmetic Conference and Exhibition in Dubai will be the place to be this year. The main event is being staged together with the sixth Global Conference Dental Hygienist Seminar of the American Academy of Implant Dentistry on 3 and 4 November at the InterContinental Dubai Festival City hotel. Before, during and after the congress, attendees will be able to partake in a range of hands-on courses in various disciplines (3–5 November). According to the organiser, the Centre for Advanced Professional Practices (CAPP), the capacity of the courses is limited in order to provide participants with the best possible opportunity to practice in small groups. The list of available courses can be found on the event website.

As part of the event, the Dental Hygienist Seminar on 3 November will offer scientific lectures and hands-on courses focusing on various aspects of the profession. Among the speakers will be President of the International Federation of Dental Hygienists Robin Watson, from Australia, who will be discussing contemporary approaches to maximising efficiency in periodontal assessment. Mary Mowbray from New Zealand will be presenting a paper on diagnosis and integrating oral cancer screening into dental practice.

An industry exhibition will be held alongside the scientific programme and be free for registered attendees. Dental professionals can register online now or on-site during the event. The opening hours of the show are from 9 a.m. to 5.30 p.m. on both days.

More information can be found at www.cappmea.com/aesthetic.

Aesthetics in focus

By DTI

BALTIMORE, USA: With promises of whiter and cleaner teeth, charcoal-based oral hygiene products have enjoyed a boost in popularity in recent times, with new products steadily entering oral hygiene racks and online shopping sites alike. However, the results of a literature review conducted by researchers at the University of Maryland School of Dentistry have now challenged the marketed benefits of these products.

“Recently, use of charcoal-based toothpastes has gained popularity in the marketplace. However, there is insufficient scientific evidence that these products effectively promote tooth whitening, oral detoxification, or provide any therapeutic properties—antibacterial, antifungal, or antiviral,” said lead author Prof. John K. Brooks from the Department of Oncology and Diagnostic Sciences at the university.

For the review, the research team combed the MEDLINE and Scopus databases for clinical studies on the use of charcoal and charcoal-based dentifrices, as well as laboratory investigations on the bioactivity or toxicity of these products. Overall, 118 eligible articles published through February 2017 were considered in the study. In addition, the researchers selected the first five consecutive charcoal dentifrice offerings from searches on Google and Amazon in order to determine product assortment and advertising promotions.

The results showed that the marketing claims of some of the charcoal products failed to reflect the actual benefits. For example, 38 per cent of the products were promoted as strengthening or remineralising teeth, according to the authors, yet only one of the examined products contained fluoride, a compound well established to enhance enamel mineralisation.

According to Brooks, the review further showed unproven claims of safety, particularly in regard to the principal ingredient, charcoal, and in some products, to bentonite clay. The latter belongs to a heterogeneous group of clays with various industrial applications and is an ingredient in skin care products, medication and toothpaste. Among other concerns, charcoal has been recognised as a mineral abrasive to the teeth and gingiva. Inclusion in products may cause damage to these tissues and could increase caries susceptibility owing to the potential loss of enamel. In this regard, 28 per cent of the products reviewed in the study claimed to be low abrasion, although laboratory test results for dentin abrasiveness were provided for only one product, the authors noted.

To establish conclusive evidence about the efficiency and safety of charcoal-based dentifrices, larger-scale studies are needed, the researchers concluded. Until then, dental practitioners should educate their patients about the unproven claims of oral benefits and safety associated with such products.

Using charcoal for oral hygiene purposes is not a new trend. In fact, powdered charcoal was used as an ingredient for toothpastes as far back as ancient Greece. For use in present-day oral hygiene products, charcoal is mostly activated by steam or chemical methods at an extremely high temperature. Once activated, charcoal has the ability to bind with toxins, stains, calculus and bacteria on the surface of teeth and the mouth in general—a process known as adsorption. Charcoal is further claimed to balance the pH of the mouth to a value that prevents bacteria from thriving and reproducing in the mouth, thus helping to protect teeth from infections caused by bacteria and other microorganisms.

The study titled “Charcoal and charcoal-based dentifrices. A literature review,” was published in the September issue of the Journal of the American Dental Association.
Impressions from Dr Patel’s practice in Milwaukee in the US.

Drs Mona Patel and Marcus Riedl in talks with Dental Tribune.

Dr Riedl’s practice in the rural town of Stein in Germany.

“Good design will pay off”

An interview with Drs Mona Patel and Marcus Riedl

By DTI

Just as in dentistry in general, where aesthetic aspects are becoming ever more important, dentists today are pursuing intentional design of their dental practices. With the launch of four new design lines, Dentsply Sirona Treatment Centers presents dentists with the opportunity to enhance workflows and treatment efficacy through clever and cutting-edge solutions while conveying their individual style. Dental Tribune spoke with German dentist Dr Marcus Riedl and Dr Mona Patel from the US, both of whom have ensured careful design of their practice environment based on their needs and preferences with a Dentsply Sirona line, about the role of aesthetics in daily dental practice.

Dental Tribune: Design can convey emotions and distinguish a dental practice from others. In your opinion, what relevance does design have in this regard?

Dr Mona Patel: In the US market, it has not played an important role for a long time. Now, with the newer generation of dentists, design is increasingly significant. I think it is just as important as the type of equipment that one purchases or the insurance one carries, because image is everything. In my opinion, the design of the practice is a direct reflection of how one provides care as a dentist. This correlation was not present in previous generations, but it is now.

Dr Marcus Riedl: I can speak for Germany and I think design aspects were mostly neglected in the past. Now, the influence of design in our practices is increasing. One has to consider that we spend almost half of our lives in our practice, so we should feel comfortable. For example, I love the mountains, skiing and the atmosphere of the Alps. Incorporating this love for nature into the design of my practice gives me a holiday feel at work.

When deciding on a particular design or the overall look of your practice, what did you put special emphasis on?

Patel: Dental anxiety is a huge component of what we have to manage, so we need to create an environment that first and foremost has a calming, spa-like feel and reduces our patients’ anxiety when they walk through the door. Secondly, in my practice, I wanted the design to be evidently smart, because that reflects my meticulous personality. I equipped the whole office with Dentsply Sirona products—in fact, it was the first all-Dentsply Sirona office in the US. I wanted to showcase the high-tech equipment and design a nice, simple office around that—not to compete with the equipment, but to enhance it.

Riedl: For many of our patients, the design aspect is just an outer shell, since they come to us for the content. We designed our practice for patients to feel at home. When they come into the office, they do not see any units at first. As for dental phobia, in my opinion, reducing anxiety mainly is the responsibility of the staff. However, a calming atmosphere is a great support, of course.

Patel: In healthcare, whole-body awareness and preventative health are becoming ever more important. A practice today is not just about treating tooth pain, but about establishing a dental home, creating a place where patients can establish a relationship with their dentist and their hygiene team.

Dentsply Sirona has developed four different design worlds: Embellished Elegance, Cheerful Patterns, Honest Materials and Pure Shapes. Which one did you decide on and why?

Patel: We chose Honest Materials because our practice has all this enhanced digital technology, which can be intimidating. I wanted to balance this digital aspect of our practice with natural and organic materials. We have a lot of birch and wood—clean, sleek, simple and balanced materials that hopefully move the focus from the equipment. My design in general is very monochromatic, nothing too messy or cluttered.
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Riedl: We too choose Honest Materials, mainly because I like nature. In our previous office design, we used the colours white, grey and green. In order to preserve our corporate identity, we wanted to keep these and combined them with a lot of wood and glass, because we wanted to convey the nature aspect to our patients. Technology is cold and patients do not want to be confronted with it directly, so we created the look of a mountain lodge. Our floors are even called “valley station”, “middle station” and “mountain station”, for example. Do you feel that patients appreciate this effort? Riedl: Some do, some do not. Patients who share the same values as we do feel more comfortable than those who think the design is unnecessary for dentistry or think it makes the cost of their care more expensive. Patel: Good design does not have to be expensive. Nevertheless, for some reason, if one puts a great deal of effort into the design of one’s practice, it is perceived as though one put a lot of money into it, which is not always the case. Would you say that the investment in the design is also reflected in the success of the practice? Patel: In the US, many things are based on return on investment. It is easier to convince oneself to invest in a CEREC or CBCT device, because one sees an immediate return on investment. However, trying to convince oneself to invest in the design with nicer cabinetry or floorplans, where there is not a direct return on investment, is more difficult. But, I am a firm believer that if one works in a beautiful and happy place, it reflects one’s standards and that is the greatest return on investment. Patients see that. If one sees that love is in every detail, the financial is not that important, the design fulfills one as a person and one’s patients appreciate the resulting work.

Riedl: Sometimes, it is about the little things. For example, my wife puts fresh flowers in every corner of the practice, which I love. However, design polarises. It divides our patients into at least two groups. Those who are interested in and impressed by our design appreciate it, of course. Others do not. I believe that treatment units and high-end equipment establish a sense of professionalism, quality and exclusivity. No patient can judge a dentist’s quality and knowledge at first sight, but, in the eyes of the patient, design and technology often are equivalents for quality, so good design will pay off. There are countless treatment units on the market and they differ a great deal. What did you consider when deciding on a system? Riedl: The treatment units are our workbenches—very expensive ones (laughs), but workbenches nonetheless. It has to be stable, easy to use, intuitive, ergonomic and comfortable for the patient, as well as for the dentist and the assistants—and, of course, easy to clean. It has to aid our treatment and therefore our daily work as a dentist. It is like the assistance systems in one’s car or a smartphone. A good design, of course, is welcome too. That is why the Teneo was our system of choice.

You both use Teneo. What sets the unit apart from those you have used before? Riedl: As a dentist, I have always worked with Sirona, now Dentsply Sirona. Therefore, there was no question of the brand I would choose. In our previous office, we used the M1 for almost 30 years—I, of course, used it only for about ten years—and I did not want to change my habits and movements during treatment. Comparing the M1 with the Teneo is like comparing an old Mercedes-Benz with a new one. It is the same quality. The Teneo might be not as solid as the good old M1, but has more features that are useful.

Patel: I was designing a new office, so I had a clean slate to work with. I did a great deal of research and comparisons. For me, the look and the design were important, as were functionality, integration, longevity and being able to sanitise it easily. I was instantly drawn to Teneo, because, as I said, I do not like clutter. The fact that everything was integrated was an instant attraction to me. I found solutions to all my wishes in the Teneo. It was an easy decision to make and we designed the office around the units.

Thank you very much for the interview.
Non-ablative melanin depigmentation of gingiva

By Dr Kenneth Luk, Hong Kong

Melanin depigmentation of gingiva using various laser wavelengths have been reported for over ten years.1–5 Layer by layer, the mucosa is ablated to the basal layer of the epithelium where the melanocytes are located. The use of lasers has been compared with the use of a scalpel and diamond bur (Fig. 1).6–9 By combining the optical properties and absorption characteristics of the 810 nm laser wavelength with specific power parameters, a non-ablative technique was developed (Fig. 2).10, 11 Another similar non-ablative technique, described as micro-coagulation, using a 20 W, 980 nm diode laser has also been reported.12 The 445 nm blue wavelength was introduced to the dental market in 2015. By using a 320 μm uninitiated fibre delivering 1 W in a continuous wave (cw) of 445 nm, the same non-ablative procedure and result can also be realised.

The author used the 810 nm wavelength (elexxion claros 810 nm diode laser, elexxion) with the power parameters of 30 W, 20 kHz and 16 μsec, yielding an average power of 10 W. Under local anaesthesia, a non-initiated 600 μm fibre was used. The fibre was placed at a distance of 2–5 mm from the pigmented mucosa. Coagulation was observed with immediate effect upon irradiation. A constant movement must be performed in order to avoid thermal damage deep in the tissue. Water irrigation can be used as a coolant during the treatment.

There is no surface ablation of the pigmented mucosa; rather, the haemoglobin and melanin absorb the laser energy (Fig. 2). This technique (Figs. 3–6) achieves a treatment time of 2 min compared with the ablative technique, which requires up to 30 min in an area extending from the first premolar to the first premolar of one dental arch. The wavelength of 445 nm is much better absorbed by melanin and haemoglobin than 810 nm is (Fig. 3). Hence, a much lower power density may be used to produce the same effect.

Eight years postoperatively, there was mild relapse of pigmentation, but the patient was satisfied with the cosmetic appearance, and requested removal of the melanin pigmentation on her mandibular anterior segment (Fig. 8). Pigment removal in the requested sites using a 445 nm diode laser was discussed. The same technique would be used and the patient consented to the treatment.

The SiroLaser Blue (Dentsply Sirona) with an emission wavelength of 445 nm was used at 1 W in cw, delivered through a 320 μm fibre. The depigmentation technique used was the same as described for the 810 nm wavelength. Under local anaesthesia, the non-initiated 320 μm fibre delivered the energy at a distance of 2 mm to the pigmented area with constant movement. Immediate change to the pink colour without surface ablation of the pigmented mucoza was observed. The procedure took approximately 40 s to complete from the mandibular left to right canine region.

In this case, the mucosa turned pink without any signs of surface mucosal ablation other than one spot between teeth #31 and 32 (Fig. 9). Subsurface coagula-

Fig. 1: Depigmentation by ablation.—Fig. 2: Depigmentation by absorption of melanin and haemoglobin.—Figs. 3–6: Depigmentation of upper arch: pre-op (Fig. 3), immediate coagulation (Fig. 4), three weeks post-op (Fig. 5), eight years post-op (Fig. 6).
tion of blood vessels imparted a pink appearance. There was very mild postoperative discomfort for about 1 h after loss of the anaesthetic effect. No analgesics were required, as the feeling of discomfort disappeared rapidly. Laser peeling of the mucosa between teeth 31 and 41 was noted during photograph taking at the one-day postoperative review (Figs. 10 & 11). The three-day postoperative photograph taken by the patient showed that the peeling had disappeared, with new gingival mucosa formation (Fig. 12). The two-week postoperative appointment showed complete recovery of the gingival mucosa and no melanin pigmentation (Fig. 13).

Discussion

There is little information available on this new wavelength. From Figure 7, the absorption coefficients are estimated at $7 \times 10^2$ cm$^{-1}$ for haemoglobin and $10^3$ cm$^{-1}$ for melanin. Penetration depth is calculated at 140 μm for haemoglobin and 10 μm for melanin. The penetration depth of haemoglobin and melanin with an 810 nm wavelength is 2 mm and 0.1 mm, respectively. Furthermore, the scattering curve showed a higher tissue scattering effect with 445 nm than with 810 nm. In comparison with near-infrared diode lasers, the absorption of collagen and scattering increases in the blue light spectrum. In view of this, together with the high absorption of 445 nm by haemoglobin and melanin, 1 W in cw was used. A power density of 88 W/cm$^2$ (Fig. 14) delivered at 88 J/cm$^2$ fluence at a 2 mm distance was calculated. Although the power density of 1,697 W/cm$^2$ delivered, the eight-year postoperative review showed a stable gingival contour with no recession (Fig. 6). An understanding of the optical properties of the wavelength, its power parameters and the laser–tissue interaction is important for the clinician to achieve the desired treatment outcome.

Conclusion

The use of a 445 nm blue diode laser at 1W in cw is effective in non-ablative depigmentation of oral mucosa. This non-ablative technique provides immediate aesthetic results in a very short procedure time. To the author’s knowledge, this is the first case presented using the 445 nm wavelength for melanin depigmentation.

Editorial note: This article was first published in cosmetic dentistry No. 1/17. A list of references is available from the publisher. Dr Luk reported no potential conflicts of interest.

Dr Kenneth Luk completed a Master of Science in Lasers in Dentistry at RWTH Aachen University in Germany and runs his own clinic, Laserdentico, in Hong Kong. He can be contacted at laserdentico@me.com.

Fig. 7: Absorption spectra of biological materials. (Courtesy of J. Meister)

Figs. 8–11: Depigmentation of lower arch: pre-op (Fig. 8), immediate post-op (Fig. 9), one day post-op (Fig. 10), one day post-op laser peeling between teeth 31 and 41 (Fig. 11).

Fig. 12: Three days post-op (photograph taken by the patient on holiday).

Fig. 13: Two weeks post-op.

Fig. 14: Diagram and calculations regarding the area of effect of the 445 nm wavelength.

Fig. 15: Diagram and calculations regarding the area of effect of the 810 nm wavelength.
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