Digital world meets in Singapore

Third CAD/CAM and Digital Dentistry International Conference to open at Suntec in December

By DTI

SINGAPORE: After two successful congresses, the Centre for Advanced Professional Practices (CAPP) in Singapore is inviting dental professionals to its third Asia Pacific edition of the CAD/CAM and Digital Dentistry International Conference. The event will be held from 3 to 5 December at the Suntec Singapore Convention and Exhibition Centre and present the latest developments and innovations in the field.

Organised in partnership with the Singapore Dental Association and the American Academy of Implant Dentistry, the show is aimed at providing an overview of the use of digital technology in dentistry and its integration into treatment processes and the practice workflow. The organisers have invited prominent experts from around the world to Singapore to give presentations on a wide range of topics, including computer-guided implantology, intra-oral scanning, and smile design. Parallel sessions aimed at dental technicians and laboratory owners will also be held. Participants will be able to earn up to 28 CE points by attending the programme.

As a complement to the extensive education offering, international dental suppliers will be exhibiting all of the very latest products, technologies, materials and services in the industry. These will include Planmeca, 3Shape, Ivoclar Vivadent, Wieland, Sirona, Amann Girrbach and VITA.

Cosmetic dentistry market

According to a new report published by market research firm MarketsandMarkets, the global market for cosmetic dentistry is expected to grow at a compound annual rate (CAGR) of 6.8 per cent from 2015 to 2020 to reach US$22.4 billion by 2020. Owing to the intensifying focus on technological innovations and the increasing trend of research and development investments, various new products, such as dental implants and equipment, are being launched on the cosmetic dentistry market and are expected to propel further market growth. However, a lack of reimbursement and the high cost of dental imaging systems are expected to restrain the growth of this market to a certain extent, the reports states.
Although some study has now found that infants exposed to smoking at 4 months of age showed an increased risk of tooth decay compared with children from a smoke-free family, prevention of tooth decay in children would contribute to caries prevention. However, a Japanese study has now found that infants exposed to smoking at 4 months of age showed an increased risk of tooth decay and 6.8 per cent had evidence of tobacco smoker exposure. The latter was defined as smoking in front of the infant by the researchers. Overall, 12,779 incidents of dental caries, mostly decayed teeth, were found in the study group.

Compared with having no smoker in the family, exposure to tobacco smoker at 4 months of age was associated with an approximately two-fold increased risk of caries at age 3. The risk of caries was also increased among those children exposed to household smoking, whereas the effect of maternal smoking during pregnancy was not statistically significant.

Although these findings cannot establish causality, they support extending public health and clinical interventions to reduce second-hand smoke, the researchers concluded.

Health statistics show that the level of dental caries in primary dentition remains high in developed countries. In Japan, one-fourth of all 3-year-old children experience caries, whereas 20.5 per cent of children aged 2 to 5 are affected in the US, according to the researchers.

The study, titled “Secondhand smoke and incidence of dental caries in deciduous teeth among children in Japan. Population based retrospective cohort study”, was published on 21 October in The BMJ.
New method to preserve carious teeth

By DTI

OTAGO, New Zealand: Dental decay is one of the most prevalent chronic diseases in New Zealand and the rest of the world. Now, researchers at the University of Otago have developed a new method that could help preserve caries-infected teeth and prolong the life of dental fillings in the future.

While caries-inhibiting products use silver that can cause significant discoloration of teeth, the new technology uses specifically formulated, non-staining silver particles to arrest caries and render teeth more resistant to decay. According to the researchers, the product has to be applied after caries removal but before filling. It diffuses into the tooth, where it can kill remaining bacteria that may cause further decay.

“We believe that our non-staining formula will be an important step forward for oral care and public health,” said Dr Don Schwass, senior lecturer and prosthodontist at the university’s Department of Oral Rehabilitation. “The result will be that recurrent caries will be significantly reduced and dental fillings will last longer, providing both economic and health benefits.”

Otago Innovation, the university’s technology transfer office, has recently licensed the rights to this formula to a global dental materials manufacturer for further product development.

Gagging for evidence

By DTI

MELAKA, Malaysia/MANCHESTER, UK: The use of sedatives, acupuncture or behavioural therapies are just some of the strategies recommended to dental practitioners for managing the gagging reflex that can occur in patients during treatment. A wide-scale review conducted by clinicians from the Melaka Manipal Medical College’s Department of Dentistry in Melaka and published by the Cochrane Oral Health Group in Manchester has recently found no evidence that any of these strategies are ineffective at preventing or managing the condition.

After a search for randomised clinical trials evaluating strategies for managing the gagging reflex, the researchers only found one study, from Brazil, on the effects of acupuncture at Point P6 versus placebo acupuncture, to be eligible for the review. Of the other 256 studies they took into consideration, none qualified to be included in the paper owing to bias, irrelevance and several other reasons.

For their review, the Malay researchers consulted Cochrane’s registration database and other medical search engines for clinical trials spanning from 1980 to the present day. Owing to the inconclusive results, they recommended that more studies be conducted on both pharmacological and non-pharmacological interventions, with special emphasis on behavioural modification techniques. Future research should also take into account a more varied population range and factors such as patient satisfaction, they stated.

Moreover, more comparable studies are needed in contrast to only trials involving a dummy or a placebo technique.

Although little is known about its prevalence, an exaggerated gag reflex during dental treatment is a problem encountered by many dental practitioners, often during denture try-in sessions. The response can be triggered by a variety of procedures, including third molar removal or intra-oral image taking.

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Tools of the trade

By Dr Les Kalman, Canada

As I think back to my younger days, I used to love to take things apart and put them back together. That progressed into a hobby as a bike mechanic. Cable replacement, greasing the bearings, wheel truing...I loved it all. I had minimal tools, but I had the know-how of how to get the job done. When I got my dream job as a shop mechanic, I was amazed that there was actually a proper tool for every job. The wrenches and ratchets were literally the tools of the trade.

It occurred to me, the mechanic needed to understand what the tools were for, how to use them and especially how to care for them. I realised and appreciated the importance of the tools, but did not want them to be the limiting factor.

Dentistry is experiencing a truly remarkable period with many ‘tools’ of digital dentistry available to the clinician and technician. These tools are not only providing increased accuracy and improved efficiency, but are also improving the experience for the patient, clinician and technician.

Communication has also been expanded with digital dentistry, allowing for easier translation of information to the patient, the insurance company, colleagues and the laboratory. With an open-source approach, the technologies have the opportunity to be merged and shared. Add in the advances in mobile technology, the portability and the utilisation of technology becomes even more appealing. From an academic and research perspective, I can attest that I am truly a tech junkie. I love gadgets. Technology seems to improve every aspect of my day. I find the technological solution to a problem a unique driving force that harnesses limitless passion. It appears to be an exciting time!

The spectrum of digital dentistry has become quite overwhelming. There are technologies that provide numerous approaches for image acquisition, easy-to-use design packages, milling/printing solutions, implant stability assessment and even real-time guided implant surgery. The technologies seem to represent every aspect of diagnoses, treatment planning and treatment delivery. It appears to be a very exciting time!

But let’s not let the excitement overwhelm us. In dentistry, we have the privilege of improving the oral health of our patients. There can be little comparison to a bike mechanic, as the human body presents mysteries limitless passion. It appears to be an exciting time!

As clinicians and technicians, we must rely on our knowledge, skills and evidence-based experience to act as our guide. From the subjective aspect of patient informed consent, to the rigorous protocols of implant surgery, let us exercise what our comprehensive training has taught us. The tools are merely there to assist us on our mission.

As we, clinicians, technicians, educators and researchers, look to advance dentistry in a modern technological world, let’s keep the digital dentistry toolbox open to more tools. Let’s always pose the question ‘why’ and try to find a solution to ongoing problems. Let us keep the aspect of accessibility in mind, with the development of open-source and affordable technologies. Lastly, let us merge our knowledge, skills and experience with the tools of digital dentistry to propel our profession as leaders in healthcare simulation.

Dr Les Kalman

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Swiss researchers create artificial tooth that mimics natural microstructure

By DTI

ZURICH, Switzerland: Materials researchers from ETH Zurich (the Swiss federal institute of technology) have developed a new procedure that allows them to mimic the structure of biological composite materials, such as teeth and seashells.

Using the new technique, they produced an artificial tooth whose surface is as hard and structurally complex as a real tooth, while the layer beneath is softer, just like natural dentine.

"Our technique is similar to 3-D printing, but ten times faster and much more cost-effective," said Dr Florian Bouville, a postdoctoral researcher from the ETH study group. The new method, called magnetically assisted slip casting (MASC), allows for the creation of complex composite materials that are almost perfect imitations of their natural models.

In order to demonstrate the technique’s potential for future applications in dentistry, the researchers produced an artificial tooth. "The profile of hardness and toughness obtained from the artificial tooth corresponds exactly with that of a natural tooth," said lead researcher Dr André Studart, Professor of Complex Materials at ETH, pleased with the results.

Although the MASC results are promising, the appearance of the material has to be significantly improved before the technique can be used for dental prostheses, Studart remarked. For the time being, the results offer proof that the natural fine structure of a tooth can be reproduced in the laboratory. Although other methods exist to imitate nacre or tooth enamel, up to now it was a challenge to create a material that mimics the complex structure of the entire seashell or tooth.

The study, titled "Magnetically assisted slip casting of bioinspired heterogeneous composites", was published online on 21 September in the Nature Materials journal.

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“Age per se is not a contra-indication”

An interview with University of Bern professor Dr Martin Schimmel, Switzerland

By Daniel Zimmermann

State of health and risk factors differ distinctly among individuals, especially the elderly. In an interview with Dental Tribune, Prof. Martin Schimmel, Head of the Division of Gerontology at the University of Bern, spoke about ethical and financial challenges regarding implant treatment of the elderly and the importance of offering this vulnerable population the benefits of implant therapy.

Dental Tribune: Implant manufacturers seem to be exclusively targeting younger age groups nowadays. Do you think the silver generation is being neglected? In your opinion, most manufacturers of dental implants are aware of the fact that people in the Western world are retaining their own teeth for longer owing to the successful implementation of preventive measures.

Prof. Martin Schimmel: I do not think that statement is true. Tooth loss is increasingly associated with elderly people. In my opinion, most dental clinics clearly demonstrate this. Narrow-diameter implants are also explicitly marketed as “Gero” implants nowadays.

Why do older patients benefit from implant therapy in particular?

Prof. Martin Schimmel: In my opinion, most elderly people. In my opinion, most elderly patients benefit from fixed implant prostheses functionally as well as structurally.

During a panel discussion at the EAO congress last year in Rome, it was found unanimously that there is no age limit for implant therapy. What is the maximum age at which dental implants could reasonably be used?

Prof. Martin Schimmel: Age per se is not a contra-indication. Even in palliative care, implants may still play a valid role. Excluding people from the benefits of this therapy owing to their statistically lower remaining lifespan is unethical. However, one must consider exactly the point at which implants in the mouth do more harm than good—primum non nocere [above all, do no harm]—particular in situations where cleaning is no longer possible and implants become merely a surface to which bacteraemia adheres. Furthermore, the possibility of medical contra indications does increase with old age.

What factors play a crucial role in the implant treatment of elderly patients, and what factors do clinicians need to consider compared with treatment of other age groups?

Prof. Martin Schimmel: Of course, the interindividual variability between patients increases with age, meaning that the older the patient, the more personalized treatment strategies have to be. The planning and implementation need to be constantly adjusted to medical, psychological and social individualities. Minimally invasive surgical approaches and prosthetic treatment methods that take the reduced adaptability and other physiological changes due to age into account have proven successful in this respect.

In Western countries, the gap between rich and poor is ever widening. Elderly people are increasingly falling into the latter group. What measures can help to ensure their access to dental implant treatment?

The only path to broad access to these therapies for financially less well-off patients lies in private or public insurance systems. These are political issues. However, dentists, dental technicians and the industry are constantly working on industrial production structures and thereby reducing costs. Digital developments in dentistry will surely help to provide patients with otherwise expensive treatments for a much more reasonable price.

In summary, digital production methods are often not suitable for the complex treatment needs of the elderly.

You have pointed out the benefits of digital production methods. What other measures could also facilitate access to dental implants for the elderly?

Nowadays, the bulk of the costs incurred is due to the hours of work performed by the dental team and technicians. Digital processes can help to shorten treatment times through innovative workflows. Moreover, quasi-industrial production methods can be used in less complex cases, thus reducing costs further. It is important to note that implant manufacturers have maintained or even lowered their price levels for quite some time. However, it remains important to evaluate the economic value of using low cost implants, because they can have a much higher failure rate, as demonstrated by a recent Swedish study (Editorial note: Derks et al. 2015).

From a health policy standpoint, do you see any deficits in the subsidisation of dental implants for the elderly?

This might differ from country to country. In Switzerland, for example, the subsidisation of patients with low income is evaluated individually by local authorities. The treatment of persons who receive social security benefits or needs-based minimum benefits is subsidised if implant therapy can be performed in a simple, economical and appropriate way. Two inter-foraminal implants, for example, will be reimbursed if conventional prosthetic treatment is not able to restore a patient’s chewing ability.

In the statutory health insurance system, there is an obligation to perform the therapy if the loss of teeth was due to the occurrence or treatment of a severe disease, or to an accident or birth defect. There is certainly room for other indications, but one also has to consider the burden for the social security systems. In my opinion, Switzerland has established a good model in this respect.

Thank you very much for the interview.
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Over 1,650 attend Ivoclar Vivadent aesthetic symposium in Vienna

By Georg Isbaver, OEMUS MEDIA AG, Germany

VIENNA, Austria: On 13 and 14 November, Ivoclar Vivadent hosted the Competence in Esthetic (CIE) symposium, an annual international event for dentists and dental technicians that focuses on dental aesthetic solutions, including digital smile design, CAD/CAM dentistry and implant therapies. Over 1,650 participants attended the symposium, where a considerable number of distinguished international speakers updated attendees on the latest developments in dental aesthetics. Attendees also had the opportunity to earn 16 continuing education credits.

According to the company, the symposium aimed to provide first-hand expert knowledge of every clinical and laboratory practice. The symposium programme was enhanced by various workshops and live demonstrations of Ivoclar Vivadent products.

Martina Jakob, Head of Marketing for Austria and Eastern Europe; Gernot Schuller, Managing Director for Austria and Eastern Europe, and Armin Ospelt, Head of Global Marketing, opened the symposium on Friday morning. Jakob particularly spoke about the recently opened International Center for Dental Education (ICDE) in Vienna, which offers state-of-the-art education facilities.

Ivoclar Vivadent’s perpetual success can, in particular, be attributed to their continuous product and service innovations, which meet actual demand. Therefore, it is not surprising that, even at a regional event such as the CIE that focuses on Austria and Eastern Europe, the company presented various new products. Among these product innovations were the IPS-style metal-ceramic material, which promises greater efficiency thanks to optimised shrinkage behaviour and aesthetics through brighter colours because of the integration of exquisitely created diamonds. In addition, the IPS e.max CAD portfolio was also extended. Furthermore, the new MT blocks with medium translucency are suitable cases that require enhanced brightness and the IPS e.max blocks with low translucency are now also available in size A14. Their new range of stains and glazes, IPS Ivocolor is now also available for laboratory-fabricated restorations. At a temperature of 1,600°C, the new sinter furnace Programat SI 600 produces zirconium oxide crown frameworks in 75 minutes.

Another topic that was discussed at the symposium was “digital Dentures”, which Ivoclar Vivadent presented in anticipation of this year’s International Show. The company demonstrated that significant progress has been made in this area. The increasing digitisation of diagnostics, design and construction of dentures, as well as large automated databases for dental geometries have facilitated the manufacturing of aesthetically appealing CAD/CAM prostheses.

MIS Global Conference: Company calls for clinical case submission

By DTI

BARCELONA, Spain/BAR LEV INDUSTRIAL PARK, Israel: In anticipation of its global conference, to be held from 26 to 29 May 2016 in Barcelona in Spain, dental implants manufacturer MIS Implants Technologies has announced an opportunity for young clinicians to present clinical cases and techniques focusing on challenging situations in implantology. The best cases submitted will be presented on the first day of the conference.

Clinicians up to the age of 40 may submit their case documentation in English via e-mail by 15 February 2016. All submitted cases will be reviewed and pre-approved by the conference scientific committee and the best case presentations will be awarded. The second-prize winner will be invited to a course by implant specialist Dr Eric Van Dooren, including flights and accommodation.

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Faster scanning than ever with Planmeca FIT, now also with colour

By DTI

HELSINKI, Finland: The Planmeca FIT system for chairside CAD/CAM dentistry provides clinics with a completely digital workflow from start to finish. It seamlessly integrates intra-oral scanning, 3-D designing and on-site milling into one system. Scanning within Planmeca FIT is now faster than ever before, and colour scanning is featured for the first time.

The Planmeca FIT system is all about integrated efficiency. Consisting of the Planmeca PlanScan intra-oral scanning and the PlanCAD EASY software and Planmeca PlanMill 40 milling unit, it allows clinics to produce perfectly fitting restorations in a single visit. The system has made great strides lately in both scanning speed and accuracy—intra-oral scans can now be performed with unprecedented quickness. Colour scanning too has been newly introduced, enhancing diagnostics and making differentiating between soft and hard tissue easier. Colour scans also improve communication and increase case acceptance, as they are easier for patients to comprehend.

Planmeca FIT workflow steps are easily controlled through the Planmeca Romexis software platform. Treatment data is immediately viewable on all workstations, and the software’s flexible licensing allows scanning, designing and milling to take place simultaneously. In addition, images and data can be sent from clinics to dental laboratories and other external partners.

The Planmeca Romexis Clinic Management module provides remote real-time usage information on Planmeca PlanMill 40, allowing clinics to locate resources and monitor ongoing milling processes. Planmeca FIT is a completely integrated approach to high-quality dental care. It helps clinics utilise their resources to the full and treat more patients in less time. Instead of two appointments, patients can be treated in one visit—with temporary crowns or physical dental models.
"We developed Invisalign G6 specifically to provide treatment to the Asia Pacific market"

An interview with John Morton, R&D Director Align Technology

At the International Orthodontic Conference in London, Align Technology showcased the latest generation of its Invisalign system, which now offers clinicians a solution for first premolar extractions. Dental Tribune sat down with the company’s R&D director, John Morton, to discuss the philosophy behind the product and how it can benefit orthodontics.

**Dental Tribune:** Malocclusion requiring the extraction of a first premolar affects only 20 per cent of patients in Europe and an even lower percentage of patients in North America. Why was Invisalign G6 developed with this specific orthodontic condition in mind?

**John Morton:** Looking at all the different types of malocclusions that exist, treatment by premolar extraction can be difficult and considered the gold standard for evaluating an orthodontic appliance. Premolar extractions may be less prevalent in the Western hemisphere than in the Asia Pacific region, where 50 per cent of cases are treated with first premolar extraction with maximum anchorage. We developed Invisalign G6 specifically to provide treatment to the Asia Pacific market.

When we launched the Invisalign system in China in 2011, we knew we needed this type of treatment. It took four years to develop, balancing movement of the canines and the anterior and posterior of the arch. Part of the goal of this project was to make clear in the minds of orthodontists that Invisalign aligners are a true orthodontic appliance capable of well-controlled movements required for extraction space closure and not just a piece of plastic.

Invisalign clear aligners have extended the user base significantly with each generation of innovation. How important is feedback from clinicians in the development process?

**John Morton:** It is very important, but there is a difference between us as a company and orthodontists in general. Orthodontists solve their treatment problems per patient in the chair on an individual basis. We have to do this on a large scale. Some clinicians, like Dr. David Couchat from France, who spoke today, are treating patients with substantially atypical malocclusion. They are very difficult cases to treat. These doctors give us fantastic insights into treatment.

In your presentation, you emphasised the way in which technology has changed the development process. We now have highly advanced sensors to measure the force systems produced by Invisalign aligners. As I said in my presentation, the design process used to be quite long, but technology has miniaturised the sensors significantly. With this type of technology, we can measure every force and movement on every tooth, and we are able to build shapes and attachments that doctors have not dreamed of. Moreover, we can do it all in the virtual world, fabricate in the laboratory and have our measurements within an hour to see if the design is better or worse than previously used.

We can try many different things in the computer programmes and learn from our mistakes without ever touching a patient. Ten years ago, we would have to put each design through a clinical trial for six months or so, only to find that it is the wrong design and have to start over. Today, the design process is down to hours instead of years.

With the latest generation, does the Invisalign system or clear aligners offer a complete solution for orthodontists?

**John Morton:** The Invisalign system is a complete orthodontic appliance today, yet there is always room for further development. We can certainly design new materials, new parts or different ways of treating patients. There are all sorts of improvement we can do. The appliance is unlimited, as has been shown by our expert clinicians. There is some resistance still because building experience and confidence takes time and effort. Our task as a company is to provide more education and support to doctors and to give them the opportunity to become confident in using Invisalign aligners.

Thank you very much for the interview.
Short-term gains...long-term problems?
The emergence of STO and its future implications in general practice

By Aws Alani, UK

The provision of orthodontics can be a life-changing experience for young patients whose "crooked" teeth can affect their confidence and self-esteem. Indeed, where mature patients present with a history of malalignment, equal benefit and fulfilling results can be achieved. In government-funded systems, patients with congenital abnormalities receive treatment that is essential to their ongoing oral health. Restorative dentists work closely with orthodontists, who can appreciate how small details can aid in achieving positive restorative outcomes.

As a young dentist, I corrected a tooth in crossbite with a simple T-spring appliance. It was enjoyable and brought a different type of delayed gradual satisfaction to the more cerebral but tenuous molar endodontics or the more artistic and instant composite build-up. I was not a specialist, but I managed to do some orthodontics. In contrast to my experience, general dental practitioners are now more routinely providing tooth movement with the emergence of short-term orthodontics (STO). This has resulted in some controversy as to the methods of achieving "straighter" teeth. Indeed, some may consider STO as an emerging entity competing with specialist orthodontics, but should it be?

The specialist training pathway for orthodontics involves a competitive-entry three-year full-time course linked with the achievement of a master’s level qualification that many may feel daunted by. Indeed, navigating the pathway from start to finish can be difficult academically and financially when factoring in fees and loss of earnings during training. Once qualified, the majority of these specialists reside, like the majority of all specialists, in the south-east of England. With this skewed distribution of specialists and assumed need for access, it might seem prudent for general dental practitioners to contribute to meeting the need for orthodontics.

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their particular product. Companies tend to boast that their product is the best with limited complications and treatment being low risk, predictable and easy. Somewhat surprisingly, courses are being run on how to convert patients into orthodontic clients. There are books describing strategies on promoting and increasing revenue. They outline detailed strategies on attracting more patients than one’s local competitor—or is that colleague? Sounds more like capitalism than commercialism to many interested observers.

The rapid development of STO has not escaped the venture (or some may say vulgar) capitalists. In the meantime, DIY Whitening and Sports guards, one can now have one’s teeth straightened via online companies using products delivered by Her Majesty’s Royal Mail and so cut out using products delivered by Her Majesty’s Royal Mail and so cut out the middleman (i.e. the dentist). To my knowledge, STO has yet to make straightened via online companies. Becoming an expert in many a field requires time, effort and experience. Orthodontics is a complicated discipline that is difficult to deliver optimally and efficiently. Treatment planning should be performed in person not only to appreciate the challenges the patient presents with but also to develop a lasting patient rapport. Equally important, patients need to be diligent during treatment and forever more for purposes of retention. Is it possible that a one-or two-day course with a treatment plan lasting half a year or less can provide equally optimal results to a specialist orthodontist utilising traditional means? In any case, placing a time limit on any treatment could be considered contentious. Patients ask me all the time “How long is this treatment going to take Doc?” I always reply “I’ll tell you when its finished.” As such I am rarely wrong.

Advertising cosmetic treatments is a complicated discipline that is difficult to deliver optimally and efficiently. Treatment planning should be performed in person not only to appreciate the challenges the patient presents with but also to develop a lasting patient rapport. Equally important, patients need to be diligent during treatment and forever more for purposes of retention. Is it possible that a one-or two-day course with a treatment plan lasting half a year or less can provide equally optimal results to a specialist orthodontist utilising traditional means? In any case, placing a time limit on any treatment could be considered contentious. Patients ask me all the time “How long is this treatment going to take Doc?” I always reply “I’ll tell you when its finished.” As such I am rarely wrong.

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Relapse of confidence

The best things in life are rarely easy. Somewhat surprisingly, there are books describing strategies on promoting and increasing revenue. They outline detailed strategies on attracting more patients than one’s local competitor—or is that colleague? Sounds more like capitalism than commercialism to many interested observers.

The Australian health ministry recently examined the provision of cosmetic procedures and in particular the modes of promoting the treatments. The working group found that advertising and promotion modes other than not focusing on the treatment benefit to the consumer, downplaying or not always mentioning risks. The group went on to identify advertising practices that were not driven by medical need and where there was significant opportunity for financial gain by those promoting these. They identified the need to regulate promotion and advertising ethically with factual, easily understood information from a source that is independent of practitioners and promoters. This is unfortunately not always readily available. In some Australian jurisdictions, there are specific guidelines that need to be adhered to for promotion of cosmetic treatments and they specifically cover before and after treatment adverts, which we know in the UK is a popular practice among the cosmetically driven. This is commonly one ideal, perfect case showcased on the front end of the practice website with no mention of any problems, either acute or chronic. Another aspect of the report detailed prohibition of time-limited offers or inducing potential patients through free consultations for the purposes of treatment uptake. The latter is something that has been STO promoted by way of voucher deals on the Internet or via smartphone applications. Others may consider such a practice as loss leading, one could ask who is losing and who is gaining and at what price?

One important aspect of the report identified the wider social impact of cosmetic procedures in that people may become increasingly dissatisfied with themselves and their appearance, culminating in deeper concerns for the person and reducing their sense of individuality. Many dentists throughout the country may have a slipped contact here, a rotation there or a space distal to a canine who are un-likely to be waiting in earnest for the receipt of their iPhones. Inducing misgivings or rais-ing concerns about the patient’s tooth position where the teeth are other-wise healthy and the patient presents with no concerns could be considered unethical and worryingly dishonest.

Clear steps to business building

A cornerstone of a successful business is the repeat customer who values the dentist and his or her service and returns with no qualms or mis-givings about what the dentist feels is a wrong decision. Advertising cosmetic procedures and in particular the modes of promoting the treatments. The working group found that advertising and promotion modes other than not focusing on the treatment benefit to the consumer, downplaying or not always mentioning risks. The group went on to identify advertising practices that were not driven by medical need and where there was significant opportunity for financial gain by those promoting these. They identified the need to regulate promotion and advertising ethically with factual, easily understood information from a source that is independent of practitioners and promoters. This is unfortunately not always readily available. In some Australian jurisdictions, there are specific guidelines that need to be adhered to for promotion of cosmetic treatments and they specifically cover before and after treatment adverts, which we know in the UK is a popular practice among the cosmetically driven. This is commonly one ideal, perfect case showcased on the front end of the practice website with no mention of any problems, either acute or chronic. Another aspect of the report detailed prohibition of time-limited offers or inducing potential patients through free consultations for the purposes of treatment uptake. The latter is something that has been STO promoted by way of voucher deals on the Internet or via smartphone applications. Others may consider such a practice as loss leading, one could ask who is losing and who is gaining and at what price?

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Relapse of confidence

In a recent publication from an industry provider, orthodontics was identified as an emerging area for claims against their clients. This is likely to be the tip of the iceberg, whose size will probably continually grow as more and more orthodontics is provided and the repercussions of which may only become apparent gradually in the future.

In the now highly litigious arena of UK dentistry, the failure of orthodontic treatment against the backdrop of Montgomery v Lanarkshire Health Board is likely to result in increased litigation. The movement of teeth into what the patient and the dentist feel is the correct position may be possible in the short term, but in the long term complications may arise owing to a variety of soft- and hard-tissue factors that cannot accommodate this new and supposedly “right” position. Indeed, orthodontics requires the appreciation of detail where symmetry and alignment are “king”, but long-term stability is the likely “empress”.

Relapse of position is a common complaint and where patients have paid handsomely for a result they may have been happy with at the time of the cheque clearing, over time tiny tooth shifts can result in disproportionate and vehement dissatisfaction. Where teeth are moved indiscriminately recession in the labial segment is a complication difficult to explain and remedy in the high lip line of a conscious and ambitious corporate female patient. Indeed, more haste, less speed may result in a case being etched longer in the memory of the patient and the clinician for the wrong reasons.

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Bisphosphonates: A threat or an option?

Prof. Per Aspenberg, Sweden

Most dentists will be familiar with bisphosphonates mainly as a cause of osteonecrosis of the jaw (ONJ). ONJ is a complication of systemic treatment. In contrast, locally applied bisphosphonates have been proven efficacious for improving the fixation of dental implants. Theoretical reasoning, experimental data, and small clinical trials suggest that local application of bisphosphonates is safe and effective in periodontology and implant surgery.

Bisphosphonates have positive effects on many conditions in bone and few and rare side-effects. Their efficacy in osteoporosis is well known, and there is evidence for improved implant fixation in an increasing number of applications. In dentistry, however, bisphosphonates are often regarded negatively, owing to the small risk of ONJ.

ONJ is indeed a problem. However, there is theoretical and clinical evidence to suggest that the risk of ONJ can be avoided by local treatment. Local bisphosphonate treatment has shown beneficial effects without complications in randomised blinded clinical trials in periodontology and dental implant surgery: How can this be? Here is an explanation.

Bisphosphonates either bind to bone mineral or are quickly excreted. Normally, they do not enter cells and are therefore not toxic. Only osteoclasts can resorb bone, and when they do so, the dissolved bone material passes through the cell. Therefore, bisphosphonates can reach the intracellular space of osteoclasts. Once inside the osteoclast, they will inactivate the cell and thus reduce bone resorption.

When bone is infected, the bone surrounding the infection will be quickly resorbed. The infected bone will therefore become surrounded by richly vascularised soft tissue that demarcates the infected area. Thus, a good resorption capability is important for preventing the spread of bone infection. This protection mechanism can be impaired if resorption is reduced by any potent anti-resorptive, leading to the spread of infection and established osteomyelitis. In dentistry, this kind of osteomyelitis is called osteonecrosis. Thus, from a pathophysiological perspective, ONJ is a somewhat misleading term. The already well-known anti-osteoclastic effects of bisphosphonates are sufficient to explain ONJ without suppositions about other, less known, mechanisms. Moreover, the theory fits with the observation that non-bisphosphonate anti-resorptives are associated with ONJ too.

When implants are inserted into bone, numerous studies have shown that—especially in cancellous bone—bisphosphonates reduce the resorptive response to the trauma without impairing the bone formation response, therefore having a net anabolic effect. This explains why both local and systemic bisphosphonates have been shown to improve the early fixation of knee and hip replacements in randomised blinded clinical trials.

Because bisphosphonates bind strongly to bone, local treatment will stay there more or less forever, and thus not impair the resistance to infection anywhere else. In an animal model of dental implants (at sites compromised by local wounding), the author’s group showed that systemic bisphosphonate treatment induced osteomyelitis (ONJ), whereas implants with a bisphosphonate coating improved implant fixation without problems in spite of the compromised insertion site. Moreover, if an implant site in humans were infected, only the bone about one millimetre away from the implant surface would contain bisphosphonate and could be removed if necessary.

In a randomised blinded controlled trial of dental implants coated with a protein layer loaded with bisphosphonates, improved fixation was demonstrated. The resonance frequency was 6.9 IQ units higher for the coated implants compared with the controls (p = 0.001, Cohen’s d = 1.3). Radiographs showed less marginal resorption both at two months (p = 0.012) and at six months (p = 0.012). The patients were followed for five years without complications.

To conclude, systemic anti-resorptives may impair protection against osteomyelitis, thereby increasing the risk of ONJ in patients with other risk factors. Local bisphosphonates seem not to confer this risk, and improve implant fixation by their net anabolic effect. Local bisphosphonate treatment could become an important tool in dentistry and maxillofacial surgery.

Conflict of interest declaration: The author has shares in AddBIO. His research is supported by grants from the Swedish Cancer Society and the Swedish Research Council. He has received lecture and conference fees from Medtronic and BioHorizons.

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Dr Per Aspenberg is Professor of Orthopaedic Surgery at Linköping University in Sweden with over 25 years experience in research and clinical trials on the use of bisphosphonates to treat orthopaedic conditions. He can be contacted at per.aspenberg@liu.se.
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**No pain, All Gain**
Achieving a nuanced interplay of colours in four easy steps

Processing the polychromatic e.max Press Multi ingot

By Michael Spiegel, Liechtenstein

For sometime, IvoclarVivadent has been offering a polychromatic, that is multi-coloured, ingot for the press technique: the IPS e.max Press Multi ingot. These innovative ingots integrate a smooth shade progression. Nuanced shade gradients from the enamel to the dentine allow multicoloured restorations to be pressed in a single sequence. The polychromatic press technique is surprisingly simple, as can be seen below.

The press technique is a proven method for creating monolithic all-ceramic restorations in the dental laboratory. Many technicians enjoy the efficient procedure that allows them to choose between using their artistic manual skills or the digital wax probe, depending on their preference. Impressive results can be achieved, especially in conjunction with lithium disilicate glass-ceramics (IPS e.max Press). Exact accuracy of fit, high strength, homogeneity and an efficient procedure are the advantages offered by this method. Refinements of morphology and function can be applied in a targeted fashion for several months now, the multicoloured IPS e.max Press Multi has been available suitably prepared for the placement of a ceramic restoration, the tooth shade is determined. As the shade of the remaining tooth structure has a substantial effect on the final aesthetic outcome, the shade of the preparation should also be determined, for instance by means of the IPS Natural Dentin Shade Guide. If, additionally, photographs of the preparations are taken, important shade gradation of the natural tooth can be observed. If a veneer is to be created, the layer thicknesses specified for the staining technique should be observed.

TheMulti ingots are clearly more chromatic in the lower area than in the upper third. This gradation follows the gradation found in natural teeth. The question arises as to how the shade layers of the ingot can be transferred to the restoration so that they are positioned in the correct place. From this point onwards, the procedure is different from the conventional press technique. A special wax-up technique and processing accessories have been developed for the polychromatic press ingots.

The waxed-up object is laterally sprayed on the investment ring. In contrast to the conventional procedure, no wax sprues are used. Instead, prefabricated precision wax parts (IPS e.max Press Multi Wax Pattern), which resemble small wax platelets, are utilised for sprueing. Depending on the restoration, either Form A or B is employed. Form A is indicated for large wax objects, such as maxillary anterior crowns (Fig. 2a), and the smaller Form B for delicate restorations (Fig. 2b). After the appropriate size has been chosen, the Wax Pattern is sprued to the wax-up. The wax-up restoration should be left on the model die while spraying to avoid damaging the restoration margins. A drop of wax is applied on the side of the Wax Pattern without altering its geometry. The conical side of the Wax Pattern is aligned towards the incisal area of the wax-up and the wax-up is carefully pressed against the wax. It is recommended to align the wax-up to the centre of the Wax Pattern in the investment ring. Since the shade gradation of the Multi ingot should be transferred to the visible part of the restoration, the vestibular surfaces of the wax-up have to be aligned accordingly. Posterior crowns are sprayed on the mesiosobucal surface. Finally, the gap between the Wax Pattern and the wax-up is dosed with a small quantity of modelling wax.

The IPS Multi Investment Ring Base has been especially designed for this polychromatic press technique. The Multi investment ring contains four openings, which are congruent with the shape of the IPS Multi wax platelets. As a result, the sprued wax-up can be accurately positioned in the investment ring (Fig. 6a). A drop of positioning wax is applied into the opening to be used. The Wax Pattern is then inserted into the investment ring base. The incisal edge of the Wax Pattern is then positioned between the remaining tooth and the wax-up. The pattern is then carefully seated in the prepared opening. Unused openings in the investment ring base are sealed with wax. Another accessory of the IPS Multi system then comes into play: the IPS e.max Press Multi Sprue Guide. Similar to a template, the Sprue...
Guide is held against the loaded investment ring to check the correct sprueing (Fig. 5). The wax-up to be pressed should be positioned within the marked area. The distance to the investment ring base must not be less than 3 mm (Fig. 6).

The investment materials (IPS PressVEST or IPS PressVEST Speed) are applied using a conventional method. Once mixed, a small quantity of investment material is brushed on to the occlusal surface and/or on to the screw channel of hybrid abutment crowns, and the insides of the crowns are filled with investment material using a suitable instrument to prevent air from being trapped. After the IPS Silicone Ring has been placed on the investment ring base, the investment material is slowly poured into the investment ring up to the marking on the silicone ring. The IPS Investment Ring Gauge is positioned with a slightly hinged movement and then pressed into position. The investment material is allowed to set in a resting environment (Figs. 7a–c). Once set, the investment ring is preheated using a conventional method.

Pressing

The IPS e.max Press Multi system includes the IPS e.max Press Multi One-Way Plunger, a single-use plunger, which is used in addition to the IPS e.max Alox Plunger. With the appropriate programme having been selected on the press furnace, the cold IPS e.max Multi ingot is placed into the preheated investment ring with the blank side facing downwards. Next, the cold One-Way Plunger and the Alox Plunger are positioned (Fig. 8). The loaded investment ring is placed in the preheated press furnace and the press programme is started. As known from the conventional press technique, the investment ring should be immediately removed from the furnace after the press process has ended and allowed to cool slowly. Divesting is performed in the familiar way. The investment ring is separated using a separating disc and carefully broken apart at the pre-determined breaking point (Fig. 9). Blasting with polishing beads at 4 bar (58 psi) pressure and then at 2 bar (29 psi) is recommended for removing the investment material (Fig. 10). The reaction layer is removed using IPS e.max Press Invex Liquid. The pressed object is immersed in Invex Liquid in a plastic cup, cleaned in an ultrasonic cleaner for 10–30 min and then rinsed under running water. The white reaction layer can then be completely removed with aluminium oxide (100 μm) at 1–2 bar (14.5–29 psi) pressure without leaving any residue (Fig. 11).

Staining

Finishing is performed with grinding tools suitable for high-strength glass-ceramics. Work is carried out at low speed and light pressure. Overheating of the ceramic must be avoided. The restoration is tried in on the die (without a spacer) and the occlusion and articulation are...
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The press technology usually transfers even the finest structures to the ceramic. In most favourable cases, filigree fissures, accentuated cusp slopes and macro-textures are reproduced one to one in the ceramic. If preferred, certain macro-textures can be adjusted by grinding to give them additional emphasis. Once cleaned, the restoration shows a smooth shade progression from the cervical to the incisal region and, as a result, the shade of the restoration looks very natural.

Fig. 11: Pressed restoration after divesting. The smooth shade progression from the cervical to the incisal is clearly noticeable. — Figs. 12 & 13: Work in progress. The natural shade progression of the two crowns is the result of the IPS e.max Press Multi ingot. If required, the restorations can be additionally customised with stains.

At this stage, the restoration can be prepared for the glaze-firing (or optional stain-firing) cycle. IPS e.max Ceram Shades and Essences are used for this step. The procedure is the same for both polychromatic and monochromatic restorations. For better wettability of the stains, a small quantity of Stain or Glaze Liquid is applied to the groove and contamination-free ceramic surface. The stains are then applied to characterise the restoration according to individual requirements. The characterisations can be intensified by repeating the staining and firing procedure. Even before the stains are applied, the incisal area appears clearly more translucent than the other parts of the restoration. This effect can be intensified by brushing on a small quantity of IPS e.max Ceram Shades Incisal.

If required, the dental technician will customise the restoration. However, this is not desired in all cases, and even without stains, the restoration appears natural and closely resembles a layered crown. Glaze firing is the final step in the procedure.

We recommend using fluorescent glaze material. The glaze is applied in a thin, but covering, coating. If minor adjustments are required after the glaze firing, they may be applied using IPS e.max Ceram Add-On materials.

**Conclusion**

IPS e.max Press Multi affords a streamlined procedure that supports the need for economic efficiency in the dental laboratory and yet does not entail sacrifices in aesthetic quality. What is so delightful about this material is that it allows you to do all, but does not require you to do everything. With or without stains, the restorations exhibit a natural variation of shade and translucency from the dentine to the incisal region. High aesthetics and high efficiency are combined with the proven material properties of lithium disilicate (IPS e.max Press), such as high strength. These properties are incorporated into the IPS e.max Press Multi ingot.
Vertical reconstruction of soft peri-implant tissues

By Dr Tomas Linkevičius, Lithuania

Crestal bone stability around dental implants remains one of the most important features of successful implant treatment. Besides major clinical advantages for the patient, stable marginal bone provides the clinician with psychological comfort and satisfaction because of the positive long-term outcome (Fig. 1). Therefore, we all need to be aware of possible causes of loss of crestal bone stability and exercise every method to prevent bone resorption.

For almost one decade, platform switching has been considered to be the most effective way to achieve this outcome. It is so effective that almost all implant companies have implemented platform switching as an essential feature of implant manufacture. It has generally been concluded that implant design is more important than the biology itself. However, recent clinical research conducted by our group has found that soft-tissue thickness is the only barrier to crestal bone around implants. It was determined that if vertical soft-tissue thickness is 2 mm or less, there will be crestal bone resorption of 1.5 mm in extent during formation of a biological seal between the soft tissue and the implant. Forabundantabutment connection and is important. An initial thought may be increasing abutment connection and is important. Another option might be reconstructing the bone during basic implant surface enhancement. The exposure of the rough implant surface enhances plaque accumulation and the development of peri-implantitis. In other words, the future of such an implant would only depend on the scrupulous cleaning abilities of the patient, which is usually not the case.

Bone augmentation procedures are based on the idea that implants having longer than the biological width be placed sub-crestally in a safe manner. It is advised that the implant stop at least 1 mm from the nerve. Consequently, we might think another option might be reconstruction of the bone during basic implant bed preparation, especially if a narrow ridge is present. Careful reduction and smoothing of the narrow ridge will not only provide a flat bone surface and a sufficiently wide area of bone for implant positioning, but will increase soft tissue thickness as well (Fig. 5). While the concept of bone removal to preserve the bone might be acceptable to some clinicians, there is no strong clinical evidence that this procedure increases soft tissue thickness and reduces crestal bone remodelling.

In conclusion, it must be emphasised that diagnosis of thin vertical soft tissue is very important in implant treatment. Only by acknowledging that tissue thickness is an important factor can we follow protocols that allow us to reconstruct vertical peri-implant tissue and reduce crestal bone loss.

Editorial note: A list of references is available from the publisher.

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What do our teeth betray about us? — Part I

By Dr Stanislav Čícha,
Czech Republic

The aim of this article is to offer readers information on a topic that is discussed very rarely in dental journals: how tooth position and damage to individual teeth reflect emotional and health status.

In 2000, I read a book by French dentist Dr Michèle Caffin, Quand les dents se mettent à parler (When the teeth talk). Because I was most intrigued by the findings of my French colleague, I started to observe these relationships and document them. I encouraged my patients to talk about their troubles and problems that did not appear to be overtly dental. In this manner, psychosomatic medicine has inconspicuously become part of treatment. It helps patients who are healthy biochemically, radiologically, etc., but who still exhibit dental problems.

In order to avoid constantly flipping through my records, I created convenient one-page diagrams mapping the significance of individual teeth. The colours correspond to acupuncture pathways. The relationship of acupuncture pathways to different groups of teeth will be discussed in Part II of this article. In Part I, I seek to convey an unconventional perspective of teeth. An example from real life: In 2000, I read a book by French dentist Dr Michèle Caffin, Quand les dents se mettent à parler (When the teeth talk). Because I was most intrigued by the findings of my French colleague, I started to observe these relationships and document them. I encouraged my patients to talk about their troubles and problems that did not appear to be overtly dental. In this manner, psychosomatic medicine has inconspicuously become part of treatment. It helps patients who are healthy biochemically, radiologically, etc., but who still exhibit dental problems.

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Similarly, on the left side (tooth #22), this position indicates opposition to the mother (Fig. 13), as was confirmed by both of the patients shown in the figures. If both teeth #12 and 22 are in protrusion and overlap the central incisors, the patient tends to have an edge over his or her parents.

In contrast, retrusion, microdontia or total anodontia (Fig. 14a) of these teeth is an indication of subordination, often both in the family and in society. For example, my questions directed at the child in Figure 14b with anterior crossbite of the primary lateral incisors were always answered by his mother and the child did not interject. Thus, orthodontic, prosthetic or implant treatment allows these patients a much better start in current society (Figs. 15a & b) and a stable position in the family.

Canines reflect the changes through which a person has gone. They erupt in times of great growth and at the beginning of adolescence (Fig. 15). The right maxillary canine represents the presentation of personality outwardly. The left maxillary canine represents attitude towards change (Fig. 17). The right mandibular canine is an expression of what we wish to achieve outwardly. The left mandibular canine is a reflection of our internal transformation (Fig. 18). The canines are generally perceived by others as a symbol of vitality and superiority. People with small canines or canine in managerial positions often have in its place an implant, or a dental restoration to rebuild the tooth. I have also observed in these teeth the retroactive effect of tooth position evident in a change in the patient’s emotional behaviour, as with the lateral incisors. A shy girl with a retracted right maxillary canine completely blossomed and gained confidence after orthodontic treatment. Of course, she made her parents anxious because they suddenly had a completely different child at home. It was probably not the only cause, but in my practice I often see similar examples of the retroactive effect of tooth alignment.

When a patient has his or her teeth aligned through orthodontic treatment, the original information is lost (Fig. 19). However, if the underlying issue is not resolved, for example a mother still dominates her daughter, who did not manage to disappear into world (tooth #21 overlapped tooth #11) or, conversely, the daughter of this mother unconsciously does not want to grow up to be a woman because she likes fulfilling the role of the good child, when such a patient stops wearing retainers to maintain the tooth position after removal of the fixed appliance or does not have his or her teeth fixed by some kind of splint, the teeth will quickly relapse apparently without cause.

Editorial note: This is the first of a two-part article which first appeared in Cosmetic Dentistry 2/15. A complete list of references is available from the publisher.

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