Adapting treatment planning

By DTI

XI’AN, China: A Chinese study comparing implant stability and peri-implant tissue response in heavy smokers and non-smokers has found that smoking did not affect the overall success of implant surgery. However, smoking did cause the bone around the implants to heal more slowly, thus, implants began to osseointegrate considerably later than in the non-smoking group.

In the study, 45 ITI (Straumann) implants were placed in the partially edentulous posterior mandibles of 32 male patients, of whom 16 were heavy smokers and 16 did not smoke at all. Implant stability and peri-implant tissue response were assessed at three, four, six, eight and 12 weeks post-surgery.

Although implants in both groups achieved osseointegration by the end of the 12th week, the healing process differed significantly between non-smokers and heavy smokers. In non-smokers, stability improved and implants began to better integrate into the bone after the second week. In the smoking group, however, implants only began to osseointegrate and become more stable after the third week. In light of the findings, the researchers suggested that surgeons might need to change their standard implant loading schedule for patients who smoke heavily. In addition, smokers should be aware that their habit promotes the loss of marginal bone and the further development of dental pockets and could thereby lead to complications even after osseointegration, they concluded.

The study, titled ‘Effect of heavy smoking on dental implants placed in male patients posterior mandibles. A prospective clinical study’, was conducted by researchers at the First Affiliated Hospital of Xi’an Jiaotong University in Xi’an in China. The results were published in the December 2016 issue of the Journal of Oral Implantology.

Love and teeth

BRISBANE, Australia: Research from the University of Queensland (UQ) has suggested a link between a healthy love life and good teeth. The study built on previous research in adult attachment theory and found that being in a trusting and happy relationship is more likely to encourage regular dental check-ups. “We determined that those who tended to avoid emotional intimacy, or worried their partner would not be available to them in times of need, were more likely to have negative oral health outcomes,” UQ researcher Grace Branjordporn said.

The study examined a group of 265 people and found that financial factors played a surprisingly small role in oral health behaviours. With many participants covered by private health insurance (and thus able to access dental care cheaply), motivation primarily came from factors like aesthetic appearance rather than affordability.

Better primary care

In an effort to enhance medical infrastructure in New Delhi, the Aam Aadmi government has announced to set up around one hundred new dental clinics. They will offer minor procedures and consultation services for oral diseases and will be located near existing Mahalla clinics.

Gonorrhoea prevention

Gargling with an alcohol-containing mouthwash could be a cheap and effective means of curbing the spread of gonorrhoea among men, Australian researchers have found. In the study, daily mouthwash use significantly inhibited the growth of the bacteria responsible for the infection.

Powdered gloves banned

The US Food and Drug Administration (FDA) has issued a final rule banning the use of most powdered medical gloves in the country. ‘While use of these gloves is decreasing, they pose an unreasonable and substantial risk of illness or injury to health care providers, patients and other individuals who are exposed to them, which cannot be corrected through new or updated labeling,’ the agency said when proposing the ban in March 2016.

According to the FDA, the powder that is sometimes added to natural rubber latex gloves to make them easier to put on and take off can carry proteins that may cause respiratory allergic reactions.

Distinguished by innovation

Healthy teeth produce a radiant smile. We strive to achieve this goal on a daily basis. It inspires us to search for innovative, ergonomic and esthetic solutions for direct filling procedures and the fabrication of short-term, temporary or durable restorations, so that you can enjoy quality products at your disposal to help people regain a beautiful smile.
Augmented reality for dental use

By Kristin Hübner, DTI

Developed for her daughter to help her focus on her daily dental care regimen, Japanese dentist Dr Kiyoshi Amano’s successful tooth-brushing app Brush’n’Save was first launched in Japan in 2014. The English version of the app is now to be released in about 95 countries. Dental Tribune had the chance to speak to Amano about how the app playfully helps children, and adults alike, develop a greater interest in oral hygiene and improve their daily brushing habits.

Dental Tribune: What gave you the idea to develop the app?

Dr Kiyoshi Amano: My daughter was in grade 9 at the time. She had never had a cavity, partly because I had always been after her to brush her teeth from the time she was a little girl, but as kids get older, they no longer want to hear what their parents say. She would stay up late playing with her smartphone and often she would go to sleep without brushing, which meant she was at a much greater risk of developing cavities. I knew I needed to come up with something that would encourage her to brush on her own. I idea of combining brushing teeth with things my daughter would enjoy and I set out to create Brush’n’Save, a tooth-brushing app on your smartphone, where the user can earn and save money by brushing their teeth.

How did you get started with the process?

First, I checked out some existing tooth-brushing apps and I found out that there were many apps available, but they were all aimed at kids or were too game-like. Then, I knew I needed to come up with something that would likely be used by teens or adults. For Brush’n’Save, I thought it should be a full-featured app with something for adults too. For example, I wanted to include information about optimal brushing time and give a detailed look at good brushing motion.

How long did the development take and when was the app launched in Japan?

It took six months to develop. The app was launched in Japan in October 2014. Once it was launched, how was it received by users—and most importantly, did your daughter like it?

User response was very positive and the app got many favourable reviews. Many people with children expressed their appreciation. The app also got many good reviews from other adult users who said it helped them get their teeth really clean and that they use the app every day. Many dentists and dental hygienists have also told me that Brush’n’Sav is the tooth-brushing app that they recommend to their patients—adults and children alike.

As for my daughter, when she heard that the app was being developed for her, she thought the idea was kind of silly, but her attitude changed when she learned that she could earn money by brushing with the app on a daily basis. (Editor’s note: With the optional savings function, parents can reward their children for continuing to brush with the app for a certain period of time without skipping. The reward can be set in the form of actual money or other treats.) And then, just as I’d hoped, she started using the app every day, brushing toward the target of that monetary reward. By developing good daily brushing habits, I think she developed a greater interest in oral hygiene.

The English version of the app will now be available globally. Do you think that applications such as Brush’n’Save will become more important—or even routine—for people’s personal oral hygiene?

While tooth brushing is something that many people around the world do every day, many don’t brush properly. Rather, they do it their own way and do an imperfect job. The result is that many people still suffer from cavities and periodontal disease, so I hope that apps like Brush’n’Save can help people develop better, and the correct, oral hygiene habits.

As a practicing dentist, what do you think is key when it comes to education about the importance of oral hygiene, and most importantly, motivating people to brush regularly?

I think it is critical that people are motivated to brush at the same time each day, using good brushing techniques. I think this encourages them to keep brushing in maintaining their own oral hygiene.

Thank you very much for the interview.

Apps for better oral hygiene habits

By Kristin Hübner, DTI

The integration of digital workflows into dental practice has continued to increase in frequency. AR technology has only been used in dental education since 2005, but it is positioned to play an increasingly more prominent role given how complex and demanding treatment dentistry can be. One of the main benefits of AR is that it allows for dentists to have relevant information displayed right in front of their eyes, instead of having to continuously refer to a computer. This enables students to apply their learned concepts to practical situations more easily and learn the appropriate dental techniques faster.

The AR glasses will also allow the instructing dentists to reduce the amount of time spent with each patient as they can supervise multiple students at one time. Comparative clinical testing was scheduled to begin in January and the UWA’s dentistry school is expected to officially incorporate the use of the glasses by the middle of the year.

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Oral bacteria, cerebral microbleeds and stroke linked

By DTI

KYOTO, Japan: Cerebral microbleeds (CMBs) have attracted attention as an important predictive marker of stroke in several studies. Research further suggests that cnm-positive Streptococcus mutans, a type of oral bacteria associated with dental caries, is involved in the development of CMBs.

Seeking to clarify the connection, a team of Japanese researchers has now found evidence that cnm-positive S. mutans is a novel factor of cognitive impairment associated with CMBs and therefore may be linked to disorders such as stroke and dementia.

Aiming to understand the clinical significance of CMBs and the mechanisms of their production, researchers from Kyoto Prefectural University of Medicine examined 279 patients (average age of 70) for the presence or absence of the collagen-binding surface Cnm protein expressed on cnm-positive S. mutans in the saliva. In addition, cognitive function, dental health status, and the prevalence of CMB were assessed.

Oral examination included the number of remaining teeth, presence or absence of dental caries, and periodontal status of the participants.

In the study group, 94 per cent tested positive for S. mutans and 33 per cent for cnm-positive S. mutans, and 25 per cent showed collagen-binding activity associated with S. mutans. Magnetic resonance imaging of the brain detected CMBs in 73 participants (26 per cent). As for the dental examination, 31 per cent of the participants had dental caries and 28 per cent scored a Code 3 or higher on the Community Periodontal Index of Treatment Needs. The mean number of remaining teeth was 22.7 ± 7.5.

The analyses showed that cnm-positive S. mutans was detected more often among participants with CMBs than those without. Furthermore, the percentage of dental caries patients was significantly higher in the collagen-binding activity group, the study found.

According to the researchers, the findings suggest a molecular mechanism for the interaction between chronic oral infections and geriatric disorders, such as stroke and cognitive impairment. In order to clarify the causality, an intervention study focused on oral care and the microbiota in CMB subjects would be of interest, they emphasised. As the current data supports the important influence of the oral microbiota on neurological disease, they further called for improved collaboration between dental and medical researchers.

The study, titled “Oral cnm-positive Streptococcus mutans expressing collagen binding activity is a risk factor for cerebral microbleeds and cognitive impairment”, was published online on in the Scientific Reports journal.

Oral bacteria, cerebral microbleeds and stroke linked

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“Essentially, we are not adapted to the diets we eat today”

An interview with Prof. Debbie Guatelli-Steinberg, US

By Kristin Hübner, DTI

In her book *What Teeth Reveal About Human Evolution* (Cambridge University Press, 2016), anthropologist Prof. Debbie Guatelli-Steinberg describes what fossilized teeth reveal about history and the living conditions of our ancestors. One finding is that the high proportion of soft and sugary food people consume in the Western world these days is to blame for the steady rise of dental problems such as dental decay and malocclusion. Dental Tribune had the opportunity to speak to the Ohio State University professor about the causes of this development and the impact her research may have on modern life.

**Dental Tribune:** Prof. Guatelli-Steinberg, you are studying fossilised teeth in order to shed light on the living conditions of our ancestors. What can teeth reveal about earlier life and human evolution?

**Prof. Debbie Guatelli-Steinberg:** Teeth make up most of the mammalian fossil record, and this is true for human evolution as well. The reason: teeth are heavily mineralised, so they resist destruction and decomposition. The fact that teeth are likely to fossilise is extremely convenient for physical anthropologists because teeth lock detailed information about diet and dental development into the development of the organism as a whole, it has been possible to use the pace of dental growth and development to gauge the evolution of the protracted childhoods that are a unique feature of humans among other primates. It is even possible, and much of my own research is about this, to use growth lines in teeth to assess the timing and duration of enamel growth disruption, providing insight into periods of physiological stress (malnutrition, illness) in the individual lives of our ancestors.

**Dental Tribune:** What sparked your interest in this field of research initially?

**Prof. Debbie Guatelli-Steinberg:** I have always had an interest in human evolution and non-human primates, and when I began my doctoral program at the University of Oregon, I met Prof. John Lukacs, who used teeth to answer questions related to these topics. This seemed like a really fascinating thing to me—that one could find out so much from fossil teeth.

**Dental Tribune:** How does one decode the information garnered from fossilised teeth?

**Prof. Debbie Guatelli-Steinberg:** One can gain information about growth rates and development in teeth or about the morphology of teeth, but that information requires a broader context for interpretation. For example, human first molars erupt at around six years of age, but that fact does not tell one much unless one compares it with other mammals, especially non-human primates. Dogs grow up fast and their first permanent teeth erupt around six months of age. They are fully mature and die much earlier than we do (which is sad for dog owners). Chimps erupt their first molars more on the order of four years of age and do not appear to have natural lifespans that are as long as ours. In other words, rates of dental development reflect the developmental rates of species, but we would not really know that unless we compared humans to other primates. This applies to fossil teeth too: we need a broader comparative context to understand the indications they give us.

**Dental Tribune:** In your new book, you say that our teeth were adapted for a very different diet than the one we eat in Western societies today. Could you explain that briefly? What are the consequences of this change in diet?

**Prof. Debbie Guatelli-Steinberg:** Well, it is possible to find dental pathologies in ancient hominin fossils, but only in a handful of individuals. So, I would say that, although dental pathologies did occur early in human evolution, they were nowhere nearly as frequent as they are today.

**Dental Tribune:** Why is that? When considering that there were no dentists or even oral hygiene products around, one imagines our ancestors must have been toothless by their mid-20s.

**Prof. Debbie Guatelli-Steinberg:** With the softer, more cariogenic foods eaten in an agricultural diet, the oral bacterial environment changed. One scientist, Dr Christina Adler, from the University of Adelaide and her colleagues, sequenced bacterial DNA obtained from dental calculus adhersing to the teeth of early hunter-gatherer and early Euro- pean agriculturalists. What they found was that, with this change in the oral environment, and later with the production of processed sugar during the Industrial Revolution, the diversity of oral flora decreased, with caries-causing strains becoming predominant. Essentially, the oral environment had changed to provide an optimal environment for caries-causing strains to flourish.

**Dental Tribune:** What role does genetics play in influencing teeth, oral health and jaw development? Since evolution is a process of hundreds and thousands of years, it is probably not possible to turn back the wheel of time just by sticking to a certain diet.

**Prof. Debbie Guatelli-Steinberg:** Certainly, genetics plays a role. Some individuals are more prone to dental disease than others, but what one eats also plays a role. As far as that goes, there is no perfect diet, but diets that are low in sugar and eating tough foods that may stimulate jaw growth during childhood might help to alleviate our dental problems.

Thank you very much for the interview.
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Measuring implant stability with the W&H Osstell ISQ module

By DTI

BURMOOS, Austria: With the exclusive integration of the Osstell ISQ (Implant Stability Quotient) module, W&H is offering users a unique system for measuring implant stability. In combination with the company’s improved implantmed functionalities, the Osstell ISQ module ensures added certainty and reliability in the evaluation of the treatment success by offering the surgeon the ability to monitor the status of osseointegration continuously and document it, along with the torque.

Determining the optimal time to load an implant is complex, since one must take into account all key parameters and the patient’s risk factors. The retrofittable Osstell ISQ module allows the surgeon to benefit from a unique system for measuring implant stability. While implantmed’s integrated automatic thread-cutter function and the torque control help the dentist during placement of implants, the ISQ module makes it easier to determine the optimal loading time.

According to the company, the stability value measured by the device helps improve the success rate of quality. With this measuring technology not only does the user know the value of the implant to more and primary stability, but the surgeon can also determine the optimal point in time for loading the implant. The ISQ value (scale of 1–100) is shown on the display after the measurement has been taken and is easy to interpret.

Implantmed’s documentation function allows convenient saving of all values of the implant placement to a USB stick. The W&H Osstell ISQ module is optional and can be retrofitted by simply connecting it to the new implantmed at a later point in time.

According to the Austrian dental manufacturer, the unique functionality of state-of-the-art technologies from both companies, W&H and Osstell, has made it possible to set new benchmarks in the international dental market and offer users a decisive bonus in terms of functionalities and optimal treatment efficiency.

The new implantmed is characterized by greater safety, ease of use, high precision and flexibility in application.

Ivoclar introduces new dental platform

By DTI

SCHAAN, Liechtenstein: With the launch of a new online platform, dental manufacturer Ivoclar Vivadent aims to provide dentists and dental technicians with continuously updated information and news about industry trends and the latest products. Through two profession-specific blogs hosted on the platform, the company further seeks to answer specific user questions and foster a lively exchange within the dental community.

‘The main focus of the blog is the readers’ benefit—both for daily work as well as fundamental questions, for example good laboratory or dental office strategies. Fascinatingly presented and with a wide variety of topics, the contributions are supplemented on a weekly basis,’ said Nicole van Oers, Communications Director at Ivoclar Vivadent.

The topics addressed in the respective blogs cover different areas of dentistry, such as aesthetics, digital development and materials, and often provide additional content, including downloads of scientific publications and explanatory videos.

In its present form, the platform has been online since September 2016. The blogs are published in five languages (English, German, French, Italian and Spanish) and can be assessed at blog.ivoclarvivadent.com. Users who subscribe to the free blog newsletter will be informed as soon as new posts are available, the company stated.
MIS announces release of B+ implant surface

By DTI

BAR-LEV, Israel: This March, MIS Implants Technologies is officially launching its latest in implant engineering, the B+ implant surface treatment, at the International Dental Show in Cologne. The B+ layer bonds chemically with the surface of the titanium dioxide of an implant and integrates perfectly with existing and newly forming bone, achieving greater initial osseointegration and longer-term stability.

With the initial results from testing of the B+ surface, it was discovered that, for the first time, specific biochemical bonding can be obtained already at the very early healing phase after implantation,” Aronsson said.

MIS was very excited to learn about these discoveries and immediately saw the potential for a major breakthrough. Having been seeking a suitable company to partner with, Aronsson and his team were equally enthusiastic about embarking on the commercialisation phase with a company able to achieve rapid implementation in clinical practice and with a strong position in the market to advance their product.

Most recently, MIS has launched a user experience project involving 250 participants worldwide, who will be placing ten implants each with the B+ surface and reporting their experiences. The results of studies conducted by Aronsson and his team are extremely promising and both partners are exploring future applications for this advancement.

Dr. Björn-Owe Aronsson, who developed this unique surface together with his team at Nano Bridging Molecules, has presented case studies in which B+ proved very efficient in maintaining the bone level over time. This is particularly beneficial for patients with compromised bone healing and poor blood supply. The specific bone-bonding properties of the surface have proved to produce greater fixation of the implant in the early stages post-placement, as well as greater stability later on.

Aronsson explains: “Titanium is used as implant material due to its inertness and high acceptance by the body. Over the years, however, a wish for faster and more predictable integration with the bone has been driving research on the importance of the surface structural and chemical properties.”

The surface consists of a monolayer of multi-phosphonate molecules. These have a very high affinity to titanium dioxide, enabling a true covalent bond. The unique properties of this layer also make it extremely hydrophilic, which facilitates the colonisation of cells on the surface naturally. Research has even shown that blood vessels grow directly into the surface of the implant, which is unaffected by the oral environment and has been proved very stable in different pH levels.

“Although the B+ surface is a simple and economic modification, the results demonstrate a potential role in the future of clinical implantology. We are looking forward to seeing how this new surface can contribute to the overall success of implantology,” Aronsson said.

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VITA Zahnfabrik to present innovative clinical solutions at IDS 2017

At the 2017 International Dental Show (IDS) in Cologne in Germany, VITA Zahnfabrik will present new process-safe solutions for highly aesthetic results, as well as efficient and smooth clinical workflows.

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With its integrated natural colour gradient in six layers, VITA ENAMIC multiColor is suitable for aesthetic single-tooth restorations in the anterior and molar regions possible. VITA ENAMIC ST (Super Translucent) is ideally suited for veneers, inlays and restorations in enamel. The solid material can be milled as usual and manufactured without any firing. It offers all of the clinical advantages of VITA ENAMIC: a pre-sintered, porous, fine-structure feldspathic ceramic block (86 per cent by weight) is infiltrated with a polymer (14 per cent by weight). Its thin layer thickness allows for both minimally invasive and non-invasive rehabilitation. Masticatory forces are absorbed owing to the dentine-like flexibility, while ceramic crack growth is stopped at the interface with the polymer network. In this manner, durable restorations are guaranteed.

VITA SMART.FIRE: Small furnace, large effect

VITA’s space-saving furnace for the dental practice allows for more efficient ceramic chairside restorations. The miniature vacuum furnace has been optimised for the requirements of chairside applications and the particular needs of dentists. Owing to its intuitive user interface, crystallisation and glazing can be realised without any special background knowledge. The intuitive “touch & fire” application enables the dentist to select the material and navigate through the menu easily. After try-in and grinding, CAD/CAM-fabricated feldspathic and glass ceramics can be finalised independently. Stressful polishing chairside can be avoided, while the quality of the surface is optimised. This furnace gives the dentist greater independence from the laboratory. The work-flow for monolithic ceramic restorations remains in the dentist’s hands.

Material-specific cementation that is easy, complete and systematic

Different indirect restorative materials follow various cementation protocols. The hydrofluoric acid may come from one supplier, the cementation composite from another and silane from yet another. This leads to full drawers and fridges resembling a rather messy storeroom. With the VITA ADIVA LUTING SOLUTIONS cementation system, reliable bond strength is ensured and orderly storage facilitated. The luting system is specifically matched to all VITA materials and offers the complete range of provisional, self-adhesive and full-adhesive cementation. Furthermore, the systematic segmentation of the tray into “practitioner” and “assistant” provides a clear overview, particularly helpful in stressful situations. Its compact design makes the VITA ADIVA set a perfect space-saving companion that is always within reach. Moreover, VITA ADIVA is compatible with restorative materials from other manufacturers too.

For more information, visit VITA Zahnfabrik during IDS 2017 at Booth D 010 in Hall 10.1.

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"We need to establish patient-centred care in all practices"

An interview with Dr Kashif Hafeez, UK

As a practising dental implantologist in southern England, Dr Kashif Hafeez regularly speaks on clinical governance and the concept of patient-centred care at congresses and seminars worldwide. In anticipation of his lecture at this year’s UAE International Dental Conference & Arab Dental Exhibition in Dubai in February, Dental Tribune had the opportunity to speak with Hafeez about the various aspects of this approach and why he believes patient-centred care should be implemented in every practice.

Dental Tribune: While “patient-centred care” is a widely used term around the globe, there seems to be little understanding of what it actually entails. Could you explain the fundamentals of this concept in your opinion?

Dr Kashif Hafeez: There is indeed an international trend towards adopting a patient-centred approach and modern health care services are aiming to incorporate it in their policies. This approach refers to a system in which the patient is the focal point of practice and all the services health care professionals provide. I call it the democracy of the health care system, which translates to a system by the patients for the patients.

The basic principle behind patient-centred care is that patients provide the maximum input to improve their state of health. It is a self-critical and self-correcting mechanism that will allow patients to have their say in the system through feedback, including surveys, questionnaires and complaints. The system analyses the feedback data, learns from it, and makes changes to the policies and their everyday application. It is cyclical and keeps evolving.

The system has to be open to critical analysis and be prepared to make the desired changes. Audits are a fundamental part of this system and these allow an organisation to evaluate itself against certain standards and set goals to improve further towards excellence.

Are there lessons that can be drawn from the practice of patient-centred care in the UK, for example?

In our practice, where we focus on implantology, we ensure that patients are the focal point of our services and pay special attention to their concerns. We understand that our primary aim is to address those concerns and allow patients to have the final say in our treatment plans. They are consulted through several appointments prior to treatment and given ample time to digest and understand the proposed treatment plan. With the help of mock-ups, patients are briefed about the final outcomes and assured that they are an integral part of the dental treatment.

What is the value of patient-centred care, and why should patients be generally more involved in their treatment process?

The value is that patients are an inherent part of their treatment. The journey of dental treatment with the patient sitting in the dental chair for hours after administration of dental anaesthetics and with the dentist holding a device in his or her hands to perform surgeries in the patient’s mouth is very daunting. Especially if patients feel that they are not in control and in charge of the whole process, it makes it even more scary for them. Involving patients in each aspect of treatment is very reassuring and comforting, giving them a measure of control. As dentists, we are often too occupied with clinical matters—the right proportions, angles and lines—sometimes forgetting what our patients really want. Listening to them and their concerns allows us to consider their wishes and needs in each aspect of dental treatment.

In the UK, we are very lucky to have an open culture receptive to criticism. We use criticism as an opportunity to learn and improve ourselves. I would like to mention anaesthetist Prof. Stephen Bolsin, who laid the foundation for the openness in our health care system. With regard to the deaths of 29 babies and children at the Bristol Royal Infirmary in the late 1980s and early 1990s, he tried first to raise this issue with colleagues, but when he was initially ignored, he took his concerns to the Department of Health.
In the UK, we have learnt a great deal over the last 20 years and have moved forward in improving ourselves. Now, we have a culture of transparency and placing patient concerns at the centre of our daily practice. The General Dental Council has made it mandatory for health care professionals to report any concerns about patient safety and patients possibly being at risk. It is also mandatory for health care professionals to receive continuing training throughout their careers on the issue of whistle-blowing and how to raise their concerns to the proper authorities.

Patient-centred practice breaks the cavalier attitude some of us may develop over the years. In our practice, we consider patient feedback as an important source of suggestions and inspiration to improve ourselves. We audit the feedback received and make appropriate changes to our system arising from this and follow this cycle on regular basis to achieve excellence.

How can this concept be applied in other dental practices, and what are the main components necessary to achieve it?

We need to establish patient-centred care in all practices. It is actually not that difficult even though the whole atmosphere and attitude of the practice has to be changed. We need to regularly identify shortcomings in our practices and audit our policies and methods. Lessons learnt from our audits should be implemented and regular re-audits should be planned. We also need to identify our educational needs, develop a personal development plan based on those needs and then plan our learning accordingly. Targets should be set realistically.

We have to develop a system of openness in our practices, and we need to encourage our colleagues to raise concerns if they are not happy with any methodology or policies. An environment of research and development has to be established, and we should keep up to date with the latest developments in dentistry, such as implantology. The world is moving at a very rapid pace, and with the advent of new technologies in our modern world, it is very easy to fall behind the rest. We should also move out of our comfort zones to develop new skills and methods.

It is a team effort after all, so training our team and keeping our team together in this effort is equally important. In our practice, we ensure that our health care professionals are well trained and up to date with recent advancements.

For those interested in making their practice patient-centred, what is a good way to start?

I think the first step is to develop a policy on clinical governance and implement it all practices. Clinical governance covers all the aspects of patient-centred practice and the various components will become clear with this policy in place. We offer courses in clinical governance and patient-centred practice policies for individual practices and educational institutions and will be happy to help any organisation that wishes to implement it.

Thank you very much for the interview.
Hybrid ceramics in practice

A CAD/CAM material for patients with functional disorders

By Dr Sjoerd Smeekens, Netherlands

The treatment of patients with functional disorders is a challenge for dentists. The extent to which the VITA ENAMIC hybrid ceramic (VITA Zahnfabrik, Germany) with its dentine-like elasticity may be a suitable material for treating patients with bruxism is described in this article. Although reconstructions with VITA ENAMIC are still experimental for this indication, I have already implemented them in my practice in experimental dentistry.

Initial situation

The 48-year-old patient had suffered for ten years from severe temporomandibular joint pain and headaches, resulting in depression, which had led to his inability to work. Numerous visits to the dentist and treatment attempts (including occlusal splinting) had brought no relief. The patient had rejected the corrective jaw surgery recommended for the existing Class III skeletal abnormality owing to the uncertain therapy outcome.

Figures 1 to 3 show the initial situation.

Preliminary treatment

After the patient’s referral to our clinic, we first tried to stabilise the occlusion via a reversible correction of tooth position. The optimal length of the incisal edges, the occlusal plane, and the horizontal and vertical dimensions were determined with a maxillary bite registration in wax (Fig. 4). It was shown that, through an elevation of the vertical dimension by 8 mm, a correction of the Angle Class III relationship was possible.

For the long-term evaluation, a PMMA splint for permanent use was fabricated on the basis of the bite registration (Figs. 5 & 6). Ten hours after its insertion (Fig. 7), the patient reported, with tears of joy, that he was pain-free. This situation has been maintained for the wear time of two years.

Material selection

Only after successful elevation of the vertical dimension were the permanent restorations fabricated. The objective was to preserve the healthy tooth substance pre-warmed composite filling material was used.

After 10 & 11) the patient’s self-confidence increased and he took up a new profession. This example shows that the non-invasive treatment concept presented can achieve outstanding results, leading to a significant increase in quality of life, even in patients with extreme functional problems.

Figures 8 & 9)

Summary

With the integration of the VITA ENAMIC restorations (Figs. 12–14), the patient’s self-confidence increased and he took up a new profession. This example shows that the non-invasive treatment concept presented can achieve outstanding results, leading to a significant increase in quality of life, even in patients with extreme functional problems.

Editorial note: This article was first published in the 1/2016 issue of the Digital Dentistry magazine (OEMUS MEDIA AG).

Fabrication of the definitive restorations

For the precise transfer of the optimal tooth position, the digital moulding was performed once with and once without the splint. The superimposed scans formed the basis for the virtual design of the monolithic restorations made of VITA ENAMIC (Figs. 8 & 9).

After fabrication, these were characterised and polished (Figs. 10 & 11). When tried in, they exhibited a high-precision fit, and the patient was very satisfied with the shade; therefore, the adhesive bonding was performed immediately. In order to create an invisible transition to the tooth substance, pre-warmed composite filling material was used.
A systematic approach to full-mouth rehabilitation with all-ceramics

By Dr Anna Giorgadze & Ilias Psarris, Greece

The extensive prosthetic work to achieve a harmonious result. The clinical treatment planning stage was based on the needs of the patient. Furthermore, specific aspects of the situation were assessed. A corresponding diagnosis was made and the patient was presented with a preliminary treatment plan. In accordance with our protocol, the plan focused on attaining a satisfactory balance between the functional and aesthetic requirements. Furthermore, mainly additive measures were planned, which would make the treatment minimally invasive. The clinical diagnosis revealed the extent of the damage. Severe abrasion had considerably shortened the anterior teeth, which showed well-defined wear facets. The vertical dimension of occlusion was clearly too low. The patient’s smile line was not ideal and therefore negatively affected her facial expression. The patient was in good general health. She did not complain of any temporomandibular joint pain or of tense jaw muscles.

Diagnosis and planning

The first general diagnosis was based on the needs of the patient. Furthermore, specific aspects of the situation were assessed. A corresponding diagnosis was made and the patient was presented with a preliminary treatment plan. In accordance with our protocol, the plan focused on attaining a satisfactory balance between the functional and aesthetic requirements. Furthermore, mainly additive measures were planned, which would make the treatment minimally invasive. The clinical diagnosis revealed the extent of the damage. Severe abrasion had considerably shortened the anterior teeth, which showed well-defined wear facets. The vertical dimension of occlusion was clearly too low. The patient’s smile line was not ideal and therefore negatively affected her facial expression. The patient was in good general health. She did not complain of any temporomandibular joint pain or of tense jaw muscles.

In the development of the final treatment plan, we first concentrated on the functional requirements. In the process, we established that the vertical dimension of occlusion needed to be raised by 1 mm and a new occlusal scheme created. Therefore, we proposed the following steps: stabilise the situation with the help of long-term temporaries before starting the prosthetic treatment, place two implants to close the gaps left by the loss of teeth #46 and #36, restore the dentition with all-ceramic crowns, bridges and veneers (IPS e.max Press, Ivoclar Vivadent), and provide the patient with a bite guard to protect the teeth after the treatment. The patient agreed to this plan.

Prosthetic pretreatment

Portrait photographs and video clips showing the patient when speaking and smiling constituted important diagnostic tools in the treatment process. They provided us with valuable information for the design of the diagnostic wax-up. Impressions were taken for the fabrication of the models. A face-bow record was taken for the skull-related transfer of the situation to the articulator. Furthermore, the new vertical dimension was verified in the mouth and it was raised by about 1 mm compared with the original situation.

From wax-up to mock-up

The models were articulated and then a diagnostic wax-up (Figs. 3–5) was created. The teeth were built up according to the new vertical dimension of occlusion. The anterior teeth were designed in such a way that their shape and length would suit the face of the patient. The aesthetic parameters, such as the smile line, midline and buccal corridor, were given as much attention as the functional requirements of the occlusion. Since we wanted to check the planned tooth length and shape in the patient’s mouth, we fabricated an acrylic mock-up on the basis of the wax-up (Fig. 6). The try-in of the mock-up allowed the dental team to obtain indispensable insight into the aesthetics and function of the restoration. It also provided the patient with a preview of the restoration and helped her to become accustomed to her new appearance. The all-ceramic restorations looked completely natural in the patient’s face.

“The all-ceramic restorations looked completely natural in the patient’s face.”
appearance. Actively involving patients in the planning process at this stage has a highly motivating effect and it positively influences the treatment result. During the try-in, the function of the restoration was tested in terms of the static and dynamic occlusion. Phonetic criteria were also checked in the process. Finally, some aesthetic details were discussed (Fig. 7).

The patient requested light teeth and bold tooth shapes.

Implant placement and tooth preparation

The prosthetic restorations in the lower jaw were removed and implants were placed in the gaps left by teeth #46 and #36. The wounds took about three months to heal. After the osseointegration of the implants and conditioning of the soft tissue, the teeth were prepared for receiving the prosthetic restorations. The premolars and molars required only light preparation. The maxillary anterior teeth were prepared for 360° veneers and the mandibular anterior teeth for ultrathin veneers (Fig. 8).

We pursued a minimally invasive strategy, which was quite easy to implement owing to the additive approach of the treatment plan. An impression of the situation was taken. Based on the mock-up, long-term composite resin temporaries (Telio Lab, Ivoclar Vivadent) were fabricated. During the next three months, the patient was able to accustom herself to the new situation. She was given the opportunity to test the new vertical dimension of occlusion and inform us about any aesthetic or functional needs.

Permanent prosthetic restorations

The patient had no trouble adjusting to the new situation and eagerly anticipated the placement of the permanent restorations. At this stage, she emphasized her requirements again: beautiful and, above all, light teeth. We decided to create the veneers with the press technique using a very light material (IPS e.max Press, LT BL3) and inidentally veneered (IPS e.max Ceram, Ivoclar Vivadent). The long-term temporaries served as a template. The restorations were produced according to the established protocol. The requirements of both function and aesthetics were fulfilled. As requested by the patient, the anterior teeth were given a bold shape. The surface of the ceramic was imparted with a distinctive micro- and macro-texture, producing an interplay of light similar to that of natural teeth (Figs. 9 & 10).
Placement of the restorations

In preparation for the adhesive cementation of the restorations, the temporaries were removed and the teeth cleaned. The anterior restorations were checked in the mouth using a try-in paste and the aesthetic results were subsequently assessed. The occlusion was checked in detail. Next, the ceramic restorations were etched with 5% hydrofluoric acid for 20 seconds. They were cleaned in an ultrasound bath and dried. Their contact surfaces were silanised (Monobond Plus, Ivoclar Vivadent). Thereafter, a bonding agent (Heliobond, Ivoclar Vivadent) was applied. The individual ceramic components were temporarily stored in a container to protect them against light and contamination. The teeth were then conditioned. A rubber dam was placed and the teeth were carefully air-abraded with aluminium oxide (0.5 µ). Subsequently, a 37% phosphoric acid gel was applied and thoroughly rinsed off after a reaction time of 15 to 20 seconds. The preparations were dried to the extent that a slightly moist, shimmering dentine surface was visible. The application of the bonding agent (lignant, Ivoclar Vivadent) followed. The restorations were placed with the light-curing luting composite Variolink Veneer (Ivoclar Vivadent). First, the veneers of the two central incisors were seated and their fit checked. Then one restoration after the other was placed on both sides. Before the restorations were light-cured for the last time, the margins were coated with glycerine gel to prevent the formation of an oxygen inhibition layer. We removed the excess with a fine diamond paste and polishers and then we polished and smoothed the margins. After the final examination, we checked the aesthetic and functional parameters in particular (Figs. 11 & 12). We provided the patient with a protective bite guard and then released her from the practice.

Result

The all-ceramic restorations looked completely natural in the patient’s face and her facial expression had completely changed. The young woman appeared to be relaxed and enjoying her new smile (Fig. 13). The first recall examination took place three days after the restorations had been placed. At that stage, the condition of the soft tissue was excellent. It had fully adapted to the ceramic surfaces (Figs. 14 & 15). The success of the treatment was confirmed at the six- and 12-month recalls (Fig. 16).

Conclusion

Sound functional principles, excellent aesthetic design skills and an outstanding materials system combined to fulfill the patient’s ardent wish for a smile makeover. The restorations gave her a new zest for life and improved her health at the same time.
An interview with Dr Mohanarajah s/o S. Senathirajah, Chairperson of the Association of Orthodontists (Singapore) Congress 2017

By Kristin Hübner, DTI

From 24 to 26 February, the orthodontic community will come together at the Association of Orthodontists (Singapore) Congress (AOSC) at Marina Bay Sands in Singapore. Dental Tribune had the opportunity to speak with AOSC Chairperson Dr Mohan about highlights of this year’s programme and why he thinks it is important for specialist congresses to both look at successfully treated cases and discuss and learn from cases that have failed.

Dental Tribune: One objective of the AOS is to provide a lively platform for dental professionals throughout the world to foster closer ties between them. How important is the congress in achieving this aim?

Dr Mohan: In orthodontics today, there are many new trends, clinical developments and techniques to advance excellence in orthodontic practices. AOS, through our biennial conferences, aims to bring together world-famous researchers, academics and clinicians to provide attendees with the most updated review of the evidence base and clinical areas related to the specialty of orthodontics.

This is the fourth biennial meeting. What has changed over the years?

In the last four editions, we have seen a tremendous growth in the number of attendees from around the world, not just limited to the Asia-Pacific region. We also have an increased number of international orthodontic companies exhibiting at AOSC, especially in the field of digital imaging.

What is the theme of this year’s event and why was it chosen?

The theme “Achieving success: Overcoming challenges in orthodontics” was chosen because, besides seeing successfully treated cases, we feel we can also learn from seeing cases that have failed. Seeing such cases allows us to review our approach and adjust the treatment plan as we go along. Our speakers have been asked to especially highlight cases with poor outcomes for discussion.

How many visitors do you expect to attend the meeting?

We are expecting 550 attendees from across the region and almost all of the workshops are already sold out. Based on our current registration numbers, we have noticed an increase in the number of visitors from neighbouring countries Malaysia, the Philippines and Vietnam and elsewhere, making AOSC 2017 a truly regional event.

From your perspective, what have been the most important developments in orthodontics in Singapore and the Asia-Pacific region in recent years?

The most important developments in orthodontics in recent years are the advancements in digital imaging and 3-D printing. Besides being crucial for orthodontic diagnosis and treatment planning, digital imaging and 3-D printing are essential tools that allow us to closely monitor treatment progress and outcome. With advancements in imaging and 3-D printing, we are able to improve the level of diagnosis, vary the treatment options and achieve more predictable treatment outcomes.

What will be happening on the pre- and post-congress days?

The days before and after the event have traditionally been reserved for limited-attendance workshops at AOSC. This edition is no different. We have five half-day workshops, which will cover topics such as how anchorage concepts with mini-screws can be implemented, how to incorporate MBT system, will be giving an overview on clinical orthodontics. Prof. Ravindra Nanda will speak on managing complex multidisciplinary patients, which is becoming more relevant these days as we see more and more adult patients. A range of topics, including retention, anterior open bite and clear aligner treatment, will also be covered, providing all participants with the opportunity to focus on their chosen key topic.

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What are the key topics of the scientific programme?

It is difficult to pick a key topic, as all of our presenters are leaders in their respective fields and will be speaking on their specialty topics. For example, Dr Richard McLaughlin, the creator of the evidence into the daily practice and the biomechanical background of Invisalign (Align Technology).

There will also be an industry exhibition alongside the congress. With the event being held just before the 2017 International Dental Show, can visitors look forward to trying out some exciting new orthodontic products?

Yes, we are excited to have increased our number of exhibitors by 15 per cent for this edition, bringing the total to 30 exhibitors representing 77 brands. Products on display will cover both well-established brands, such as Invisalign and CEREC (Dentsply Sirona), and new brands and services, such as Dental Monitoring and JoyAligner (Bliva). There will also be a number of live demonstrations of products and software during the exhibition that visitors can look forward to.

Aside from the exhibition and the lectures, what networking events have you planned this year?

Our networking events are among the highlights of AOSC. This edition’s fully booked welcome reception will be held at Aura, which sits on top of Singapore’s newest museum, the National Gallery. The location offers great views of Singapore’s skyline, while reflecting Singapore’s history, as the building in which the restaurant is housed is the former Supreme Court of Singapore.

The Gardens by the Bay Run will give participants another opportunity to meet with their peers. I believe that the run is unique to our conference and exhibition. This edition’s two kilometres route will take participants along both the Marina Bay and the Gardens by the Bay before the conference begins on the second day.

Thank you very much for the interview.
Orthodontic supplies market: Report predicts highest growth rate in AP

By DTI

PUNE, India: While North America and Europe are expected to have accounted for the largest share of the regional segments in the global orthodontic supplies market in 2016, the Asia-Pacific market is projected to register the highest growth rate over the next five years, a new report by market specialist MarketsandMarkets has found.

According to the research firm, the forces driving this development are growing efforts to increase awareness of advanced orthodontic treatments in the region and a very large patient population with malocclusion and jaw disorders. In addition, growth is being stimulated through increasing disposable income, coupled with a growing middle class and the stronger focus of global orthodontic and dental companies on emerging Asia-Pacific countries.

Overall, the global orthodontic supplies market is expected to grow further at a compound annual growth rate of 8 per cent over the forecast period of 2016 to 2021 and is expected to reach US$47.1 billion by 2021.

Among the three major product categories, fixed braces, removable braces and orthodontic adhesives, the fixed braces segment is expected to have gained the largest share in the global orthodontic supplies market in 2016. According to the analysts, this is primarily attributed to the greater affordability (compared with removable braces) and increasing adoption of fixed braces among adolescents.

According to the market review, the major competitors in the orthodontic supplies segment are 3M, Align Technology, Danaher Corporation, Henry Schein, Dentsply Sirona, American Orthodontics, Rocky Mountain Orthodontics, G&H Orthodontics, Denzaum and TP Orthodontics.

The full report, titled Orthodontic Supplies Market by Removable & Fixed Braces (Brackets [Self Ligating, Lingual, Metal, Ceramic, Aesthetic]), Archwires (Nickel Titanium, Stainless Steel), Ligature (Elastomeric, Wire), Anchorage Appliances—Adhesives, Patient—Forecast to 2021, can be purchased from the MarketsandMarkets website.
**“We need to update our knowledge on the various aligner systems available”**

An interview with Dr Graham Gardner, President of the European Aligner Society

By Brendan Day, DTI

Since it was commercially introduced in 1999, aligner therapy has grown and developed substantially as an orthodontic treatment modality. Dr Graham Gardner is the first President of the European Aligner Society (EAS), an organisation dedicated to increasing education and research in aligner therapy. The inaugural EAS AlignerLab workshop will be held in Vienna in Austria on 18 February and aims to provide a hands-on learning experience for dental professionals interested in updating their knowledge of aligner treatment. Dental Tribune interviewed Gardner about the role of aligners in orthodontics and what the event organisers have in store.

**Dental Tribune:** What benefits do aligners offer over fixed orthodontic appliances, and how have these developed since aligners were first introduced?

Dr Gardner: In my opinion, the advantages of aligner therapy for the patient are:

1) They are more comfortable than fixed appliances.
2) They are more aesthetic, and therefore less noticeable, compared with fixed appliances. This is especially important for someone seeking orthodontic treatment because he or she is already concerned and self-conscious about his or her teeth, as the last thing such a patient would want is to draw attention to his or her teeth with fixed appliances.
3) Improved maintenance of oral hygiene and no dietary restrictions, as the aligners are removed for eating.

The advantages of aligner therapy for the orthodontist are:

1) Improved treatment planning capabilities owing to the 3-D treatment software Virtual treatment planning allows one to evaluate different treatment options that, crucially, can be more clearly discussed with the patient owing to the virtual presentation process. In my opinion, this allows the patient to make a more informed decision on the treatment.
2) Broken brackets and emergencies are things of the past.
3) Improved maintenance of oral hygiene and no dietary restrictions, as the aligners are removed for eating.

Additionally, a benefit shared by both patient and clinician is that adjustment appointments are often quicker and certainly more comfortable for the patient compared with fixed appliances.

**Dental Tribune:** What have the main impediments to the adoption of aligners by dental professionals?

I think that, initially, aligners were basic and our knowledge on how to move teeth with plastic was limited. Hence, in the earlier years, only minor tooth movement could be predictably treated with aligners, and this limited their use and then restricted the number of practitioners prepared to use aligners. Combined with the fact that the practitioner now had to learn new software programmes and how to plan treatment on a computer—a vastly different skill to having the physical study model in one’s hands and brackets on teeth—one can see why the initial take-up was perhaps less than would have been expected.

The first EAS AlignerLab is set to take place in Vienna in February. What prompted the EAS to hold this workshop, and what can participants expect to gain from it?

We are excited about the first AlignerLab. With the explosion in the 3-D treatment planning and manufacturing processes now available, we at the EAS believe that not only do we need to update our knowledge on the various aligner systems available, we also need to understand the associated hardware, such as scanners, computers and 3-D printers, and software that is necessary to optimise the aligner system and improve treatment results. It is therefore our objective to bring these two areas together at one event with the AlignerLab.

This will allow attendees an opportunity to listen to world-famous clinicians on different systems, to compare these different aligner systems and to gain hands-on experience with the different equipment associated with these systems.

We think it is a unique way to update our knowledge on aligner therapy, with a bonus opportunity to forge links with our colleagues across Europe.

**Dental Tribune**

The event’s keynote speaker will be Prof. Henry Fields, the Vig/Williams Endowed Division Chair of Orthodontics at Ohio State University’s College of Dentistry in the US. Fields’ talk will cover growth modification, smile aesthetics, and orthodontic surgical treatments. In addition, a number of Australian and international researchers will be conducting presentations throughout the two days of the meeting. Those speaking include Dr Prashant Zaveri, Chairman of the Asian Pacific Foundation for Orthodontic Research and Education, and recipient of the Medal of the Order of Australia Dr John Fricker.

The Foundation Dinner on the evening of 3 March is sure to be a highlight, as it will take place in the riverside restaurant of Brisbane’s heritage-listed Customs House.

**Organisers of ASOFRE 2017 invite orthodontists to Brisbane**

By DTI

BRISBANE, Australia. The Australian Society of Orthodontists’ Foundation for Research and Education (ASOFRE) will play host to many of the speciality’s leading figures on 3 and 4 March at its 2017 Foundation Meeting at the Hilton hotel in Brisbane. The organisers have warmly invited dental practitioners to attend the meeting, which has the theme of ‘Aesthetics and evidence’ this year.

The Foundation is the primary organisation for orthodontic research and education in Australia. It aims to foster a collaborative and sharing environment through its biennial Foundation Meetings and provides financial and educational support to Australian universities.
3Shape and Ormco expand collaboration

By DTI

COPENHAGEN, Denmark: Danish dental manufacturer 3Shape has announced that its indirect bonding solution, a function within the company’s orthodontic software, now integrates with the Damon System bracket library by Ormco Corporation. Consequently, users are now able to digitally place the Damon brackets based on a virtual model produced by 3Shape’s TRIOS intra-oral scanner or conventional laboratory impressions.

“We are very excited to provide orthodontists and labs with access to the Damon System bracket libraries. The integration gives professionals the advantage of a fully digital workflow to reduce chair time and increase treatment efficiency and patient comfort,” said Allan Junge Hyldal, Vice President of Orthodontics at 3Shape.

Owing to the simpler procedure, indirect bonding has proven to have multiple benefits for the patients compared with direct bonding, including reduced treatment and chair time, as well as less physical and mental stress.

The newly integrated Damon System bracket library joins more than 150 original bracket libraries and orthodontic solution providers. “Ormco is pleased that doctors now have access to our advanced passive self-ligating metal and aesthetic brackets, including the improved Damon Clear2 bracket,” commented Ormco President Patrik Eriksson on the collaboration.

“With the increased demand for aesthetic and effective treatment solutions, Damon Clear2 enables 3shape customers to efficiently treat all of their patients—including complex cases and mixed dentition—to an exceptional result,” Eriksson said.

Ormco’s Insignia Advanced Smile Design already accepts TRIOS scans for treatment. With the integration of Ormco’s Damon System bracket library, the companies are expanding their collaboration.

“AD

Ormco’s Insignia Advanced Smile Design already accepts TRIOS scans for treatment. With the integration of Ormco’s Damon System bracket library, the companies are expanding their collaboration.

“We are very excited to provide orthodontists and labs with access to the Damon System bracket libraries. The integration gives professionals the advantage of a fully digital workflow to reduce chair time and increase treatment efficiency and patient comfort,” said Allan Junge Hyldal, Vice President of Orthodontics at 3Shape.

Owing to the simpler procedure, indirect bonding has proven to have multiple benefits for the patients compared with direct bonding, including reduced treatment and chair time, as well as less physical and mental stress.

The newly integrated Damon System bracket library joins more than 150 original bracket libraries and orthodontic solution providers. “Ormco is pleased that doctors now have access to our advanced passive self-ligating metal and aesthetic brackets, including the improved Damon Clear2 bracket,” commented Ormco President Patrik Eriksson on the collaboration.

“With the increased demand for aesthetic and effective treatment solutions, Damon Clear2 enables 3shape customers to efficiently treat all of their patients—including complex cases and mixed dentition—to an exceptional result,” Eriksson said.
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Creative adjuncts for clear aligners to improve predictability

By Dr S. Jay Bowman, US

The concept of clear aligners has grown in leaps and bounds inter-
nationally since the introduction of Invisalign (Align Technology) in 1999. In the 1940s, Dr Harold Kesling first proposed the original theoretical basis for moving teeth with a series of retainers, but it took more than 50 years before computer technology made the idea workable.

Although some of the initial excitement attending the idea that all patients could be treated without metal fixed orthodontic appliances wore off quickly, early adopters and innovators have worked diligently to improve and enhance clear aligner methods. Limitations of clear aligner treatment simply required some time and experience to discover, but ultimately resulted in a series of articles quantifying issues often experienced clinically. 1–16

As patients’ and practitioners’ desires for aesthetic alternatives to fixed appliances continued to coalesce in the past decade, there have been a number of technological and biomechanical advancements that have led to an ever-increasing number of treatment application possibilities for aligners, including the expansion to treating teenagers. 17–22 In those endeavours, a series of articles were published suggesting innovative treatment options with various adjuncts to clear aligners. 19–21, 23–26 The design of this cut-out is in the shape of a teardrop with the intent that the reservoir of the notch will keep an elastic in place on the aligner (Figs. 2a–d). In this manner, the aligner with elastics can be inserted into the mouth, reducing the fumbling and difficulty associated with attempting to put elastics into slits or notches after the aligner tray is already on the teeth. The Tear Drop cuts can be made anywhere along the aligner tray edges where elastics may be needed, such as inter-maxillary Class II, Class III or delta, or Class I intra-maxillary applications, even involving the use of mini-screw anchors to support the elastic forces (Fig. 5). 19–26

The Hole Punch

The Hole Punch instrument is used to create a half-moon cut-out...
that area for each tray in a series resolved by clipping the plastic in the gingival margin of aligner trays. The incisive papilla is usually used to produce an indent or torque. A horizontal 19–21, 24 and it is primarily used to produce an indent to affect a change of tooth root position or torque. A horizontal indentation into the plastic at the gingival margin of the aligners will emphasise the force applied to torque the roots of individual teeth (Fig. 9a). These horizontal indentations can also be placed at the right-angle junction of a composite attachment and the tooth to enhance the contact, thereby increasing the effectiveness of the intended tooth movement and reducing the risk of the plastic may slip away. Another option is to place horizontal indentations at the marginal undercuts of the crown of the teeth to increase the retention of aligners or retainers (Fig. 9b).

Common applications: Beating aligner lag and bootstrap mechanics

Besides facilitating the typical addition of inter-maxillary elastics for a variety of anchorage supports for tooth movement or intention to alter dentalvector compensation (i.e. Class II, Class III, resolving deep and open bites, extraxion space closure, etc.). A common application for the Tear Drop and the Hole Punch is establishing bootstrap mechanics. 23 For instance, a tooth or teeth may be lagging behind the prescribed movement, especially in terms of extrusion—the tooth may not be following along the projected path (Fig. 10). This may be due to inadequate space created adjacent to each side of the tooth or lack of adequate contact on the tooth or attachment.

Initially, Chewies Aligner Tray Seaters 23 are another of our creations from our private practice, DENTISPLY Raintree Essex) are routinely used at each new aligner to assist in seating them on to the teeth (Fig. 11a), along with instructions to massage the trays into place (use fingers to push the trays on to the teeth as though attempting to stretch them over attachments and undercuts for the first few days). Despite those efforts, an air gap between the incisal edge of the teeth and the plastic may develop (Fig. 11b). It may be that inadequate space has been created prior to extrusion and the interproximal contacts thus cannot pass by each other (consider the widening taper towards the anterior incisal edges) and aligner lag or lack of tracking is the result.

In these instances or in anticipation thereof, a bootstrap set-up is prepared 23. This consists of placing bonded buttons on the lingual surface of the offending tooth near the gingival margin by creating clearance for the button in the aligner plastic with the Hole Punch (Figs. 12a & b). On the facial surface of the same tooth there are two options: another button and a hole punch (Fig. 11c). The Tear Drop is used to create two elastic notches at the mesial and distal gingival embrasure spaces (Fig. 12d). A small-diameter orthodontic elastic is then applied to either the teardrop notches or the button on the facial surface of the tooth and stretched over the occlusal surface of the aligner to the lingual button. In this scenario, the elastic is intended to more predictably extrude the tooth into the aligner to the prescribed position.
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