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Dear readers,

A teacher of mine and a talented chief physician of general surgery taught me that “the best is the enemy of the good”. I am referring to when we were young and ambitious surgeons looking to achieve perfect final closure of the wound. Insisting on placing the last stitch, though not essential, resulted in damaging a blood vessel, forcing us to reopen the patient.

A nice article I read recently (“Teeth within an hour” by Dr Göran Urde, Implant Tribune, Middle East & Africa Edition, November/December 2017) leads me to paraphrase the aphorism of my teacher as I do in the title and to reconfirm what I have repeated constantly all over the world. I see more and more that we are witness to an increasing and often unmotivated tendency to have everything and to want it immediately, even healing processes. As Dr Deepak Chopra, a physician and contemporary biologist, has said: “We are the only creatures on earth who can change our biology by what we think and feel.”

Therefore, in an era in which the Internet and smartphones render waiting obsolete and Dr Google has the solution to all our problems, our patients expect biology to follow this trend, adapting the length of healing to their changed expectations. In this new scenario, patients have the same expectations when it comes to dental treatment—and this applies to every type of treatment, from implantology to orthodontics. Knowing that new procedures and offerings are continually being developed, patients are asking for solutions that meet their expectations more than their biological needs—and of course with no discomfort or problems.

In this crazy race among specialists to see who is quicker to place implants or align teeth, that will soon lead us (unfortunately an obvious prophecy that has many adherents) to a dramatic fallout in terms of failures, insurance problems and renewed distrust of our already mistreated specialty, for which many are responsible.

Companies, in doing their work, try to convince us to adopt new techniques and new protocols less and less validated by time and numbers. Unknown companies offer cheaper and innovative systems not supported by studies and research, and dentists (together with their patients) will act as human guinea pigs.

As professionals, we are too often prone to external pressures: instead of safeguarding the independence of our decision-making processes, to avoid the risk of losing the case to be treated, we can be tempted not to do what science and our conscience would suggest is needed, and rather let ourselves be influenced by what the external world imposes on us, often personally facing the consequences for it.

I would like to conclude by quoting George Bernard Shaw: “Science is always wrong. It never solves a problem without creating ten more.” Let us go back to treating cases only after serious and careful evaluation and using validated protocols that we have mastered. Gaining a few months to later lose teeth wrongly or too quickly is not always the best ethical choice.

Yours faithfully,

Prof. Mauro Labanca

MD, DDS, is an oral surgeon, and a fellow of the registrar of the European section of, and a councillor of the International Council of the International College of Dentists.

The best is often the enemy of the good
editorial

The best is often the enemy of the good
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Anti-ageing medicine and orthodontic appliance therapy treatment: An interdisciplinary approach

By Dr Derek Mahony, Australia, & Dr Theodore R. Belfor, US

Introduction

Anti-ageing is a branch of medicine focused on how to prevent, slow or reverse the effects of ageing, thus helping people to live longer and healthier lives. Recently, however, more evidence-based medicine has led to anti-ageing becoming a multi-billion-dollar industry. In the past few decades, the market for anti-ageing products and services has grown into a global industry valued at an estimated US$261.9 billion in 2013, up from US$162 billion just five years before, according to BCC Research, a publisher of technology market research reports based in Wellesley in the US.1

The recent medical literature and evidence-based medicine show that, as we age, there seems to be a loss of fat volume in some areas of the face, as well as a change in the morphology of the facial skeleton. Facial soft-tissue augmentation by injection has become increasingly popular as a minimally invasive option for patients seeking cosmetic facial enhancement. Replacing lost soft-tissue volume allowed for a more comprehensive approach to total facial rejuvenation. It has been demonstrated that orthodontic treatment with an intra-oral orthopaedic dental appliance (Homeoblock, OrthoSmile) increases soft-tissue volume and enhances facial symmetry, producing soft-tissue changes consistent with improved facial esthetics.2 This appliance can be added to the treatment protocol of facial injection to create a relatively non-invasive interdisciplinary approach to midface enhancement.

With this article, we show how orthopaedic/orthodontic appliance therapy, in conjunction with the placement of dermal fillers for the reduction of lines/wrinkles and depressions in the face, can produce desirable facial soft-tissue enhancement. Furthermore, we show that the volumetric changes achieved by this combined treatment approach can produce a desirable result, namely a more youthful appearance.

Case study

A healthy woman in her mid-sixties presented for treatment with a strong desire to improve her facial appearance (Fig. 1). Her oral hygiene was good and there was no active periodontal disease. She had headache symptoms and clinical examination showed a disc displacement with reduction on her right side, with a maximum jaw opening of 38 mm. Her centre line was displaced 2 mm to the right and lined up when she opened < 10 mm, indicating that she had a mandibular displacement to the same side. A Homeoblock appliance, with a 5 mm bite block on the right side (to decompress her temporomandibular joint), was fabricated and delivered (Fig. 2). When she closed on the bite block, her occlusion freed up and the muscles realigned the mandible so that her centre line lined up correctly. Her headache symptoms were relieved in three weeks and her maximum opening was improved to 42 mm. The patient continued Homeoblock treatment for nine months.

Intra-oral and extra-oral photographs were taken to monitor treatment, and 3-D stereophotogrammetry was performed. Extra-oral 3-D digital photographs were taken with a facial capture system (3dMD). A facial capture system (3dMD/Kodak) and stereophotogrammetry were used to generate a clinically accurate digital model of the patient’s facial surface. It uses a technique of stereotriangulation to identify external surface features viewed from at least two cameras. This approach incorporates the projection of a unique, random light pattern that is used as the foundation for triangulating the geometry in 3-D. The capture takes < 2 ms per frame. The data is processed and a highly precise < 0.5 mm root mean square of the distance measured is calculated, creating...
Fig. 1 Pretreatment facial and anterior intra-oral photographs (note deep dental overbite). Fig. 2 The Homeoblock appliance.
Fig. 3: The pretreatment face, the post-treatment face at six months and nine months, and finally, a morphometric evaluation of the change.
Fig. 4: Morphometric evaluation of the final results: finite element analysis showed increased facial volume with a directional change of almost 4 mm, indicated by the red to orange colour. Fig. 5: Superimposing the red post-treatment face over the blue pretreatment face, we can graphically illustrate the volumetric changes that occurred during our treatment. There was an increase in volume in the frontal, supra orbital, inferior orbital, zygomatic, nasal base, upper lip, nasolabial depression, and marionette and pre-jowl areas. Fig. 6: Morphological facial changes in the lips, zygoma and jowl area after the placement of 1 ml Restylane and 1.3 cc Radiesse. Note the deeper red to orange colour in the areas where the injections were placed.

Results

Post-treatment, the patient’s face appeared more youthful with better defined cheekbones and a firmer jaw line. The skin appeared smoother with fewer lines, wrinkles and depressions (Figs. 7a & b).

Discussion

Facial changes related to palatal expansion are clearly outlined in Singh: “The maxillary complex shows a change in size (and/or mass) allied with an increase in structural complexity, in association with biological processes.” Palatal expansion presumably, switches on osteoblastic genes associated with active boney deposition and concomitant remodeling of the spatial matrix ensues. In relation to the changes around the eyes, we must recall that the maxilla forms the floor of the orbit and skeletal changes may become apparent after expansion; specifically, changes in orbital morphology may be reflected on the skin of the face: as the lower eyelids become tighter, the lateral canthus becomes more horizontal; facial width increases, particularly at the zygomatico-maxillary sutures; and the craniofacial form, putatively, not only functions better, but looks more attractive. These changes have been documented in children, where palatal expansion is an everyday occurrence. The current article documents similar changes in a non-growing adult. Combining the results of palatal expansion and the placement of dermal fillers, we obtained a very satisfactory improvement in facial aesthetics.
Dr Derek Mahony

is a Sydney-based specialist orthodontist who has spoken to thousands of practitioners about the benefits of interceptive orthodontic treatment. Early in his career, he learnt from leading clinicians the dramatic effect functional appliance therapy can afford patients in orthodontic treatment, and he has been combining the fixed and functional appliance approach ever since. His lectures are based on the positive impact such a combined treatment approach has had on his orthodontic results and the benefits this philosophy provides from a practice management viewpoint. He can be contacted at info@derekmahony.com. His website address is www.fullfaceglobal.com.

Theodore R. Belfor, DDS

Dr Theodore R. Belfor graduated from the New York University College of Dentistry in the US in 1966. He is a senior certified instructor for the International Association for Orthodontics, lectures internationally, was Chairman and President of Ortho-Smile, and is the inventor of the patented Homeoblock orthopaedic/orthodontic appliance. He has been published in the New York State Dental Journal, the Journal of Cosmetic Dentistry, Aesthetic Dentistry Today, Dentistry Today, the Journal of the American Academy of Gnathologic Orthopedics, the Functional Orthodontist, International Journal of Orthodontics, and Sleep Diagnosis and Therapy.
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Non-extraction treatment of severe crowding with the aid of cyclic forces and corticotomy

By Dr Gaetano Turatti, Dr Amedeo Salomone & Dr Luca Giordano, Italy

Introduction

The reduction of orthodontic treatment time represents one of the more common requests by patients. However, while we attend to the patient’s request, safely moving teeth and stability of our results are very important and must be stressed. The acceleration of dental movement and treatment time also may help in reducing the risk of caries resulting from difficulties in maintaining adequate hygiene, in reducing the effort on the part of the patient and in allowing the orthodontist to obtain complex orthodontic movement using simple biomechanics. Especially from a biological point of view, there is a reduction of stress on the dental roots and on the supporting surface and deep tissue.1

In medical literature, various non-surgical approaches have been reported to achieve the acceleration of orthodontic movement, for instance laser biostimulation and photo-biomodulation, the application of magnetic fields, as well as the targeted injection of prostaglandin E2 and vitamin D.2 In fact, the rate of tooth movement per month in the group of patients who used AcceleDent (1.16 mm/month) was 48.1% faster than in the control group (0.79 mm/month). A retrospective study by Bowman showed that the alignment and levelling time of the lower jaw was faster in the group using AcceleDent (93 days) than in the control group (120 days).3 This is equivalent to a 30% reduction in treatment time. A study by Orton-Gibbs and Kim found that fixed orthodontic treatment in combination with AcceleDent was 38.2% faster and aligner treatment in combination with AcceleDent was 37.2% faster.4

The purpose of this report is to present a case of a patient with severe crowding. Treatment included interradicular corticotomies in conjunction with the AcceleDent device.

Case report

The 17-year-old male patient came for an examination in December 2014. The objective intra-oral examination revealed a bilateral Class I molar relationship and a canine relation of Class I and Class II on the right. The transverse trans-molar diameter of the upper dental arch was normal, while there was a reduction in the inter-premolar diameter associated with severe crowding in the intercanine region. In the lower dental arch (narrow, parabolic shape), there was dental crowding with complete deficiency for tooth #42, which was in an ectopic lingual position. Complete deep bite with masticatory trauma to the adjacent gingiva was observed in the lower incisal region. The teeth of the upper arch were slightly larger than average, with a minor moderation of Bolton’s index. The objective extra-oral examination revealed that the subject had a long face, the development of the middle third of the face was normal, and the nasal pyramid was wide and associated with mild mandibular retrusion (Figs. 1a–h).

The cephalometric analysis confirmed a Class I skeletal pattern (ANB angle: 4°), meso-divergent facial pattern (SN–GoGn angle: 35°) with retroclination of the mandib-
ular incisor (incisor mandibular plane angle [IMPA]: 84°) and proclination of the maxillary incisor (U1–SN angle: 117°; Figs. 10a & 11a).

The following treatment options based upon treatment goals were considered:

1. If facial balance and airway extension were paramount to the patient, orthognathic surgery would be the plan of choice.

2. If tooth alignment was the only goal, an orthodontic plan in conjunction with corticotomies and AcceleDent would be followed.

The case could also have had a maxillofacial surgical resolution after extracting two premolars in the lower arch and closing the spaces to allow greater mandibular advancement. The patient was not ready to accept this treatment method. The decision was, therefore, taken to proceed without extractions with the help of the interradicular corticotomies in the upper arch and the use of the AcceleDent device for the alignment of the lower arch.

Surgery was performed under local anaesthesia on the upper dental arch with the incision and detachment of a full-thickness flap from tooth #16 to 26. After performing interradicular corticotomies, an antigen-free porcine bone graft was applied and covered with a platelet-rich fibrin membrane (Figs. 2a & b). The flap was repositioned with detached sutures.

Seven days after surgery, the suture was removed and a quadhelix appliance was applied with the aim of molar de-rotation and rapid palatal expansion. At the same time, the upper arch was bonded with self-ligating brackets (Damon Q; Figs. 3a–d). Alignment and levelling of the upper arch were achieved using nickel-titanium archwires in the following sequence: 0.014, 0.018, 0.016 × 0.022, 0.019 × 0.025 in.

Six months after the intervention, a mandibular bi-helix expander was cemented with the aim of transverse expansion of the posterior and mandibular sections (Fig. 4). At the same time, the AcceleDent device was delivered and the patient was advised to use it for 20 minutes per day. Two months later, following uprighting of the posterior and mandibular sections, the lower arch was bonded with self-ligating brackets (Damon Q), with the exception of tooth #42. Alignment and levelling of the lower arch were
case report
achieved using nickel-titanium archwires in the following sequence: 0.014, 0.016, 0.018, 0.019 × 0.025 in. The space required for tooth #42 in the ectopic lingual position was obtained within eight months after the lower bi-helix application and six months after the bonding of the lower arch. The space was reached by inserting from the first archwire an open spring coil between teeth #41 and 43 and retrieving it in the arch by initially introducing a ligature for closure and subsequently, upon attaining the correct fit, bonding and engaging tooth #42 with a 0.016 in. nickel-titanium archwire (Figs. 5a–e). After the alignment and levelling of the mandibular right lateral incisor, the final treatment step involved the correction of the Class II left canine using Class II intermaxillary elastic bands with 0.019 × 0.022 in. stainless-steel upper and lower archwires.

The objectives of the treatment plan were achieved in 21 months by attaining a Class I molar and canine relationship with ideal overjet and overbite. A fixed mandibular retainer and a maxillary Hawley retainer (Figs. 6a–h) were used for retention.

Discussion

After collecting and analysing the records, it became clear that the case was particularly complex because, while the lack of space in the upper arch did not require extraction, the lack of space in the lower arch would require extraction, which would prevent the patient from achieving an ideal overjet and overbite. Obviously, the complexity of the case could give rise to different and varied treatment interpretations, such as extraction of two premolars and closure of spaces and subsequent mandibular advancement, increase of the inter-canine diameter through the transmandibular distraction surgical treatment method, extraction of tooth #42 and the final phase of the case without a centred midline with overjet and increased overbite. The initial retroclined position (IMPA: 87°) and the presence of a well-represented symphysis allowed satisfactory vestibularisation of the incisors (IMPA: 104°) with an excellent response of the soft tissue (Fig. 7) and bone (Figs. 10b & 11b). At the level of the upper arch, the CBCT scan revealed an improvement
in bone tropism in the premolar area due to the bone graft inserted during the corticotomy procedure (Figs. 8a-8f & 9a-9d). The decision to treat the lower arch without a corticotomy procedure and with only the vibration forces induced by cyclic loading was due to the fact that the patient did not want to undergo a second surgery, which would have been complicated given the ectopic position of tooth #42 and on the basis of confirmed cases in the medical literature about faster alignment and levelling of the lower arch in patients treated with AcceleDent.

Conclusion

This case report has demonstrated the use and effectiveness of AcceleDent in a challenging environment (crowding, little bone and narrow arches). Future work by the authors and others can pool data to demonstrate the effectiveness of non-invasive accelerated technology to provide patients with not only accelerated tooth movement, but more importantly predictable tooth movement where teeth can be moved safely.

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

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Tooth whitening and orthodontics: The icing on the cake

By Dr Yassine Harichane, Canada

Tooth whitening is a therapeutic procedure that provides the final touch to orthodontic treatment. The objectives in orthodontics are both functional—restore masticatory function, swallowing, breathing and phonation—and aesthetic—balance and harmonise the face, and improve the smile. To achieve the last goal, various criteria are taken into account: tooth alignment, shade and shape, and even the shape of the lips. All these parameters are important; however, the most visible aspect of the smile is the dental shade. One can restore function, correct an occlusal dysfunction, close a diastema or even inject dermal fillers, but if the teeth are left yellowish, the smile remains unattractive. Tooth whitening is a therapeutic solution that restores the natural lustre of the teeth by removing organic stains, which means it is not tooth bleaching. For the orthodontist, there are only advantages. It is easy to perform, non-invasive, requires no anaesthesia and produces no irreversible destruction of the tooth. This procedure is rewarding for the dental team, since the dental assistant can be involved in all steps of the process. It is suitable for the majority of patients. Tooth whitening is a cost-effective technique that requires little material and time, and is efficient if the practitioner is rigorous. Finally, the main concern for patients, it is painless.

How does it work?

The enamel shade can change because of tobacco stains, food or trauma, for instance. The protocol involves the application of a tooth whitening product, such as hydrogen peroxide, carbamide peroxide or sodium perborate. The last one must be avoided, since it is classified as repro-toxic. The first two are efficient and safe. The difference between them lies in the fact that hydrogen peroxide is the active ingredient and carbamide peroxide is a derivative that degrades into hydrogen peroxide. This release is progressive and slow. This process is suitable when the practitioner desires a soft and progressive effect. Regarding dosage, the percentage provided by the manufacturer reflects the concentration: 1% of hydrogen peroxide is equivalent to 3% of carbamide peroxide. In Europe, the maximum limit for vital teeth is 6% hydrogen peroxide or 18% carbamide peroxide.

What are the indications?

There are two main indications: intrinsic post-eruptive stains and extrinsic stains. Intrinsic post-eruptive stains concern mostly clinical cases involving pulp necrosis (trauma, endodontic treatment, endodontic calcification). Among extrinsic stains, there are tobacco stains, discoloration due to ageing and physiological stains. It is in the last category to which most post-orthodontic treatment applies. Indeed, tooth whitening will allow beautiful finishing by complimenting the orthodontic result. The patient will notice the difference—the teeth are well-aligned and whiter—and forget that the orthodontic process took so much time, as the tooth whitening needs just a few days. The treatment is of benefit to the practice too, since the orthodontist not only restores the function, but improves the aesthetic outcome painlessly too.

How to perform tooth whitening

The different techniques will be demonstrated through clinical cases. In the first case, the patient was being treated with a lingual appliance (Fig. 1) and wished to whiten her teeth. In-office tooth whitening was deemed the most suitable. The soft tissue—gingivae, tongue and lips—must be protected (Fig. 2). The product is applied to the vestibular aspects of the teeth (Fig. 3) and renewed every 15–20 minutes. A good result can be obtained (Fig. 4) with a gentle and efficient product containing 6% hydrogen peroxide (Opalescence Office, Ultradent Products; Fig. 5). Hydrogen peroxide was chosen because, being the active ingredient, its efficacy is immediate. A 6% concentration is the limit, but it is strong enough to observe a difference and low enough to avoid temporary thermic hypersensitivity.

A take-home whitening process entails the use of trays loaded with tooth whitening gel. After an orthodontic treatment, two options are available. An impression of both arches is taken, then stone models are prepared. A soft tray sheet is thermoformed, which allows the making of custom whitening trays (Fig. 6). At the second appointment, the patient receives the trays and the product, together with the user instructions for one or two weeks.
on the basis of daily use for 60–120 minutes (Fig. 7). For this application, carbamide peroxide of 10% or 16% is chosen (Opalescence PF, Ultradent Products; Fig. 8). The choice of carbamide peroxide is suitable for at-home application, since the gel releases hydrogen peroxide progressively. The choice of concentration depends on the clinical case. A young patient or a patient with already treated thermic hypersensitivity should use 10% carbamide peroxide. Any other patient or a former smoker should use 16% carbamide peroxide. For at-home application, if the practitioner does not wish to prepare trays in-office or through the laboratory, an already prepared kit containing ready-to-wear trays can be used (Opalescence Go, Ultradent Products; Fig. 9). In this case, at the first appointment, the patient receives a kit containing a tray pre-filled with tooth whitening product. Once at home, over ten days approximately, the patient applies the tray into the mouth and leaves the gel to work for 60–90 minutes (Figs. 10 & 11). It is a huge time-saving approach for the patient and the orthodontist, with an uncompromised result.

Cost of materials and treatment fee

For in-office application, an Opalescence Office kit costs approximately €90. Generally, the kit contains two syringes, enough for two appointments with the same patient or two different patients. For at-home application, if the office owns a thermoforming machine, the dental assistant prepares the trays, and two thermoforming sheets cost €2. Otherwise, a dental technician usually charges €50 to produce a pair of custom trays. The Opalescence PF kit with carbamide peroxide costs about €60 for the 10% or 16% concentration. If the orthodontist does not wish to spend time and money on custom trays, the ready-to-use kit should be used. It costs €70 for the trays already loaded with tooth whitening gel.

In-office application requires one hour. The practitioner does not need to be with the patient throughout the entire procedure, but applies the gel and leaves it to complete its cycle. For custom trays, a first appointment is necessary for the impressions and another to deliver the trays.
and the product, taking altogether less than 15 minutes. Otherwise, the pre-filled trays are delivered to the patient and the dental assistant explains the process in a short appointment. In my experience, having custom trays with good fit will significantly reduce any saliva ingress and always provide optimal results.

The fee depends on the financial strategy of the office. The treatment may be free, in order to offer a gift after a long and/or expensive orthodontic procedure, or to compensate for an imperfect final result. If this is a gift, the patient feels privileged. Otherwise, the fees are calculated according to the hourly cost of the office, based on the time spent on the process as estimated by the specialist. A final possibility is for the practice owner to determine the fee based on that charged by competing practices. The mean cost is €700 for in-office application, €400 for at-home application with custom trays and €200 for the Opalescence Go kit.

**Tips and tricks**

Previously, it was noted that thermic hypersensitivity can occur. It is better to prevent this, and to this end, the specialist has a great deal of choice. Among the plethora of products on the market, we have found Profluorid Varnish (VOCO; Fig. 12) to offer particular stability. This varnish, which is applied to the tooth surface, has desensitising properties. Its use is entirely suitable for tooth whitening. We also recommend sending the patient home with a prophylaxis kit (Remin Pro or Remin Pro Forte, VOCO; Figs. 13 & 14).

Another tip is to use orthodontic aligners to perform the at-home whitening. The only disadvantage is that the whitening product will be squeezed between the tray and the teeth and can flow to the gingivae when positioning the tray in the mouth. That is the reason to prefer custom trays. The limits follow the gingival margin in order to avoid potential excess. Moreover, we strongly recom-
mend reading the manufacturer’s instructions and preparing a reservoir in the tray according to the manufacturer’s instructions. To this end, one need only add some resin to the vestibular aspects of the teeth on the stone model (Fig. 15). The advantage is double, since the reservoirs will guide the patient to put the exact quantity of gel in the correct place with no excess.

During the whitening, the patient should not smoke or consume staining drinks like coffee and tea to avoid any re-coloration of the teeth. The best solution is to perform fluoride application after the treatment. The fluoride kit (Bifluorid 10, VOLO; Fig. 16) contains single doses to apply to the vestibular aspects of the teeth. This fluoride varnish will protect the tooth surface against staining in order to maintain a long-term result.

What about the law?

In Europe, hydrogen peroxide is limited to 6% (18% carbamide peroxide) for vital teeth. This concentration is really enough for a tooth whitening, but not sufficient if the patient comes to the office expecting a Hollywood smile. Since hydrogen and carbamide peroxide are efficient, there is no reason to use sodium perborate, but it is not prohibited. Finally, the dental assistant is allowed to be involved in the process. He or she can take the photographs, measure the dental shade before and after the treatment, prepare the trays and even explain the instructions of use. All of this is simple and accessible. The orthodontist should refer to national regulations to determine whether the dental assistant can take impressions or apply the gel to the teeth. However, diagnosis and responsibility remain the duties of the practitioner.
Conclusion

Tooth whitening is a procedure that complements orthodontic finishing. It is a final touch that makes a visible difference. The technique is simple and does not require long and fastidious training, only strict adherence to the protocol. The practitioner’s rigour is enough to understand the protocol. This aesthetic dentistry tool adds value to the orthodontic office and to the dental team involved in the process, from the front desk to the chair, not to mention that it significantly improves the before and after photographs. Finally, everybody, the patient and the team, is satisfied at the end of the treatment.

Conflict of interest and acknowledgements

The author has no disclosures to make. The author would like to thank Dr Shiraz Khan for the proofreading and friendly support.

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Recommended by dentists - loved by their patients
New concepts in aligner therapy with the orthocaps system

By Dr Wajeeh Khan, Germany

Historical background

Overlay appliances have been used in orthodontics for more than 90 years. In the early days, such appliances were shaped like positioners, that is formed as single-unit appliances with tooth cavities to receive both maxillary and mandibular teeth. For minor orthodontic tooth movement, Remensnyder in 1923 described a rubber gingival massaging appliance that he later patented as an “orthodontic appliance”.

In 1945, Kesling published a landmark article in the American Journal of Orthodontics and Oral Surgery titled “The philosophy of the tooth positioning appliance”. In this article, Kesling described the making of a set-up model after teeth had been cut out from a plaster cast and repositioned in wax on the model base. The “positioner” was thus formed as a negative of the model created by repositioning teeth in wax, Kesling, in a patent that was granted in 1945, stated that, if the extent of tooth movement was beyond the scope of a single appliance, more than one appliance could be used in sequence to move teeth. McNamara et al., Ponitz, Nahoum, Sheridan et al., Rinchuse and Rinchuse, and others also described the use of overlay appliances that took the form of modern-day aligners to achieve orthodontic tooth movement.

As the use of CAD/CAM became common in dentistry in the 1990s, the concept of using digital 3-D scanners and rapid prototyping technology became apparent in the manufacturing of aligners. François Duret, a French innovator and dentist, used CAD/CAM techniques to construct dental prosthetic and restorative units as early as 1983. In 1996, researchers like Alcañiz et al. and Hemayed et al. separately described in detail the use of CAD/CAM techniques to create computerised set-ups and rapid prototyping models for diagnostic and therapeutic purposes in orthodontics.

In 1998, Align Technology commercialised the production of aligners using such CAD/CAM techniques. Although the Invisalign system is the most widely used, some companies, including Ortho Caps, offer alternative aligner techniques, such as the orthocaps system.

Aligner mechanics

The mechano-transduction (transmission of force) of orthodontic forces triggers a tissue response that results in orthodontic tooth movement. Teeth and the surrounding tissue do not differentiate between force generated by aligners or any other type of appliances. The factors that determine the quality and quantity of orthodontic tooth movement depend greatly on the force system that is used, including the amount of force, its duration and dynamics, and the underlying tissue response. It is therefore imperative that the design of the appliances, the material property of the thermoplastics, and the interface between the tooth and the appliance are conducive to creating a force system that ensures controlled, effective and safe tooth movement.

Aligner design

Aligners are removable appliances and are therefore inherently at a disadvantage when compared with fixed appliances. The aligner-tooth interface is mechanically less efficient in transmitting orthodontic force to the surrounding tissue as compared with systems based on brackets and wires. In order to overcome this disadvantage, it is important that the appliance design incorporates features that enable the aligners to have a good grip on teeth and allow the aligners to have maximum surface contact with teeth.

Material properties of thermoplastics

A variety of thermoplastic materials are available that can be used for manufacturing aligners. These materials not only differ in their composition and thickness, but also differ in properties such as elasticity, which is essential for tooth movement. The choice of material essentially depends on the type and amount of tooth movement, the required force levels, and the condition and health of the underlying tissue.

The aligner-tooth interface

As already mentioned, in order to transmit force effectively, it is important to create an interface (contact area)
that allows the transmission of force without loss of magnitude, directional control, or both. This requires an exact aligner fit, as well as an accurate reproduction of the tooth surface and the interdental areas in models that are used to manufacture aligners. Aligners manufactured on such models have the required fit on the teeth to achieve a good grip.

The orthocaps system

The orthocaps system is designed to address the core problem that many aligner systems have, namely, the lack of ability to transmit force to teeth without mechanical or directional loss, and the lack of adequate control while delivering forces that move teeth accurately in all six degrees of freedom ($x$, $y$, and $z$-axis translation and $x$, $y$, and $z$-axis rotation) in 3-D space.

For this reason, the system emphasises the use of elastic materials in the fabrication of aligners. The orthocaps system (TwinAligner) also uses two different types of aligners for each treatment step throughout the treatment. This technique ensures the use of optimal forces that can be generated by selecting different thicknesses of elastic materials that are used for aligners that are worn at night or during the day (DayCaps/NightCaps).

Aligner design

In the orthocaps system, an exact aligner fit is of paramount importance. Modifications to aligner design, like pressure points, dents, divots or certain types of structures, such as power ridges, that are used in some other systems to direct force to certain areas on clinical tooth crowns are thought to be counter-productive. These modifications result in spaces and voids (Fig. 1) that are created between the teeth and aligners and therefore reduce the grip of the aligners on teeth. The main design feature for the orthocaps aligners is thus the ability to encapsulate the teeth completely. This allows the maximum surface of the teeth to be in contact with the soft inner aligner layer, which is more elastic than the outer rigid aligner shell (layer). High-pressure thermoforming techniques also facilitate flow of the aligner material into the interdental areas, thereby increasing the surface contact area with the aligners.

Thermoplastic materials

Material elasticity is the foremost property that is needed in achieving controlled tooth movements. Elastic deformation of aligner materials generates the force that is required to move teeth. Elastic materials can be deflected or deformed to a greater extent without losing their shape or form. This deformation is generated owing to the difference in the position of teeth between the set-up model on which the aligners are fabricated and the actual position of the patient’s teeth. If the aligner material is elastic, the aligner regains its original shape completely when it is removed from the mouth. This means that the aligner remains active and continues to exert a force until it returns to its original form and thereby moves the teeth effectively. In contrast, inelastic and rigid materials undergo a plastic deformation even at lower deflection levels (strain) and thus lose their form and therefore are unable to move teeth. This is why inelastic materials for aligners are not as effective as elastic materials.

In Figure 2, the material stress is plotted along the $y$-axis. The amount of stress is the force ($F$) in newtons
divided by area (A) in m². The material strain or deformation is measured as a percentage of deflection from the original state of rest. For linear deformation, this is calculated as the increase in length (l) divided by the initial length (L). The elasticity (modulus of elasticity, E) of a material is shown by the gradient of the curve and is calculated by dividing stress by strain as shown in the following equation:

\[ E = \frac{F/A}{(\partial l/L)} \]

Bending, stretching or deforming a material beyond its elastic limit results in plastic deformation of the material. It is important to remember that elasticity is a material constant and does not depend upon the thickness or geometry of the material. The same degree (%) of deflection or strain would result in permanent deformation of a given material regardless of its thickness or shape.

Orthodontic movement is thus caused by the rebound force that makes the elastic material regain its original state or shape. This force is directly proportional to the area, modulus of elasticity, and the deflection or strain the material is undergoing, provided that the material is not strained beyond its elastic limit as shown in Figure 2:

\[ F = AE(\partial l/L) \]

Attachments

Many types of attachments can be used to increase the efficacy of tooth movement with orthocaps. The use of soft and elastic materials also makes it easier to use attachment types that would otherwise be impossible to use with rigid or hard materials. Some of the attachment types are shown in Figure 3.

Friction pads

Apart from normal attachments, a new type of attachment, a friction pad, was developed at the Ortho Caps centre in Germany. This friction pad consists of a flat...
textured surface that is bonded to the tooth in order to increase the friction between the inner aligner surface and the tooth. The advantage of using friction pads is that these textured surfaces are only a fraction of a millimetre thick, making them almost invisible under normal circumstances and therefore more acceptable to patients. Figure 4 shows the CAD model of the friction pads on two teeth.

The attachments or friction pads are bonded to the teeth by indirect bonding techniques. Preformed attachments or friction pads are sent to the clinician placed in the first aligners ready for indirect bonding. Figure 5 shows the friction pads bonded to several teeth. As can be seen in the photographs, the friction pads are only visible on close inspection. This aesthetic advantage of friction pads over regular attachments makes this type of bonded retention aid much more acceptable to patients seeking an invisible treatment option.

Clinical cases: Before and after records

Case 1

This young adult female patient was treated for maxillary and mandibular crowding and deep bite over 18 months (Fig. 6). The orthocaps Pro system was used without any auxiliaries.

Case 2

This young female teenager was treated for a Class II bite and deep bite over 24 months (Fig. 7). The orthocaps Pro system was used without any auxiliaries. Towards the end of the treatment, a BiteMaintainer was used as an active retainer.

Case 3

This 45-year-old female patient was treated over a total of 28 months with a distalising apparatus based on temporary anchorage devices, followed by orthocaps aligners, to correct the overjet and a midline deviation (Fig. 8).

Case 4

The treatment for this 12-year-old was started in the mixed dentition with orthocaps Kids (Fig. 9). The last phase of the treatment was completed with orthocaps Pro. No auxiliaries were used in the entire treatment, which took 30 months.

Case 5

This 33-year-old female patient was treated for posterior crowding over 28 months (Fig. 10). The maxillary right first molar was extracted and the space closed by moving the second molar into the extraction space with orthocaps aligners. At the end of the treatment, Ortho Caps provided a lingual auxiliary, consisting of four lingual brackets and a pre-ligated nickel-titanium wire within an indirect bonding tray to bond the appliance. Subsequent aligners were designed to immobilise the two premolars, while allowing the second molar to upright. This design created the necessary anchorage in order to upright the second molar effectively.

Conclusion

The mechanical limitations of aligners can be overcome, and satisfactory orthodontic tooth movement, even in complex cases, can be achieved to a certain extent provided the following conditions are met:

1. knowledge of the limitations of aligner mechanics;
2. use of auxiliaries (mini-screws, expansion appliances and partial fixed appliances) in conjunction with aligner treatment;
3. use of elastic thermoplastic materials to avoid plastic deformation of aligners during treatment and to optimise force levels (light forces);
4. accurate reproduction of interdental areas in digital scans to allow maximum aligner–tooth contact;
5. high-pressure thermoforming techniques to achieve better aligner adaptation;
6. sound planning (regulation of the amount of movement per stage) in the treatment staging process;
OrthoCaps is an effort in that direction.

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

Dr Wajeeh Khan is a specialist in orthodontics and runs a private orthodontic practice in Hamm in Germany. He is the Managing Director and Chief Executive of OrthoCaps. Khan is a member of the German Orthodontic Society, French Orthodontic Society, Deutsche Gesellschaft für Linguale Orthodontie [German society for lingual orthodontics] and American Association of Orthodontists. He is a Fellow of the World Federation of Orthodontists. Khan regularly conducts lectures at symposia and universities in Europe. He can be contacted at info@orthocaps.de. 

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Embracing Sagittal First treatment—The Carriere Motion 3D Appliance: Revolutionising Class II and Class III corrections

By John Lannon

In talks with John Lannon, orthodontists Dr Luis Carrière and Dr John Graham discuss the “sagittal-first” philosophy and the science behind Henry Schein Orthodontics’ Carriere Motion 3D Appliance, which facilitates orthodontic treatment and shortens treatment times.

Dr Luis Carrière, who invented the Carriere SLX Self-Ligating Bracket System and the Carriere Motion 3D Appliance, lectures internationally on these products, as well as other topics. Carrière is a member of the editorial review board for the American Journal of Orthodontics and Dentofacial Orthopedics and a visiting professor at several orthodontic departments throughout the world. He maintains a private practice in Barcelona in Spain.

John Lannon: What features of the Motion 3D Appliance make it so effective?

Dr Luis Carrière: Its sleek, non-invasive design has allowed it to revolutionise Class II and Class III correction. The appliance attaches to only three teeth, so it’s comfortable and discreet, while it also allows for the use of the progressive Sagittal First philosophy to correct the anterior–posterior discrepancy at the beginning of treatment, when patients are most compliant. It delivers a gentler, more natural force for tooth movement, controlling the movement of the tooth and providing crucial corrections to the bite and tooth alignment, in preparation for treatment with fixed orthodontic appliances or clear aligners. The appliance provides shorter treatment times for mixed dentition in adolescents and adults.

How does the appliance fit into Henry Schein Orthodontics’ tenet of airway-friendly orthodontics?

The appliance, based on the action of the human hip ball and socket joint, repositions the mandible forward as a unit for those patients who need it and controls it with built-in stops for direct molar movement to the ideal position. This prevents over-rotation and unwanted tipping and can be an effective means of increasing a patient’s airway.

It’s been astounding and exciting to watch the progression of airway-friendly orthodontics in our industry. Orthodontists everywhere are realising how they’re able to provide patients with more than just beautiful smiles—they also can provide the opportunity for patients to live healthier, happier lives, which is a strong aspect of Henry Schein Orthodontics’ culture.

How does the appliance shorten treatment time?

Class II or Class III correction takes place at the beginning of the orthodontic treatment, when there are no competing forces in the mouth caused by brackets or other appliances. This is also when the patient is the most motivated and compliance is at its highest. Treating to the Class I platform is made simple and usually completed in three to four months. Each Motion 3D Appliance addresses its intended sagittal dimension to reduce the need for extractions or surgery, and also helps reposition the jaws in better relation to one another, balancing the relationship between the nose, lips and chin for facial harmony. Both are biomimetic in function and consist of a small single-part design. This offers patients considerable freedom of movement for significantly greater comfort than conventional anterior–posterior correctors.

Changing the patient experience for the better

Dr John Graham is an innovator and educator who lectures internationally to both orthodontists and the practice team on orthodontic treatment philosophies. He holds faculty appointments at the University of the Pacific’s Arthur A. Dugoni School of Dentistry and the University of Rochester’s Eastman Institute for Oral Health, both in
the US. Graham serves on the editorial board for ortho-town and is a contributing editor for the Journal of Clinical Orthodontics.

John Lannon: The Carriere Motion 3D Appliance fits into the Henry Schein Orthodontics’ tenets of airway-friendly orthodontics, shorter treatment times and the Sagittal First philosophy. Could you explain how it’s used in your practice and the results you’ve seen?

Dr John Graham: The Sagittal First philosophy using the Motion 3D Appliance is a real paradigm shift in the way orthodontists treat patients. It helps me reduce patient treatment times—sometimes by up to one year. It’s so rewarding to offer this treatment concept because I no longer receive hesitation from patients, especially adults, about moving forward with treatment. I get to explain that they won’t be making a commitment to wearing fixed appliances for two years—most likely, it will be around a year or less.

How do the appliances work with clear aligner therapy?

The orthodontist and the patient don’t have to decide between fixed appliances or aligners before the patient starts treatment; we can think about it while the anterior–posterior discrepancy is being corrected. This new treatment method allows me to treat more cases with clear aligners. The Motion 3D Appliance allows me to easily turn complex Class II patients into Class I patients; previously, a complex case would not have been suitable for aligner treatment. Also, using the appliance allows you to empower patients to be compliant. As you monitor them through the anterior–posterior correction, you can see if they’re a good fit for aligners.

How did you gain your staff’s acceptance with this shift?

For an orthodontist to succeed with any new treatment philosophy, you need to have buy-in from your staff. The great thing for me when I introduced the Sagittal First concept to my staff is that it made total sense to them that the heaviest lifting we do in ortho, which is generally the anterior–posterior correction, should take place at the beginning of treatment, rather than after the patient has already been in fixed appliances for a year or longer.

What benefits does the Motion 3D Appliance offer that haven’t been previously experienced?

I’m able to confidently tell my patients that their treatment time should take a year or less. With the Sagittal First philosophy, I am able to achieve anterior–posterior correction on average in just three months! Anterior–posterior correction used to take a year and at the end of treatment, when no patient was interested in being compliant any more. Also, because the Motion 3D Appliance is so discreet, patients don’t think of themselves in treatment even though they are. You’re able to get patients to commit to being cooperative at the beginning of treatment, when they are excited about the impact fixed appliances will make on their lives.
Corporate profile — Going straight to the source

Henry Schein Orthodontics’ mission is to provide state-of-the-art orthodontic products and innovative clinical solutions that enable its customers to offer exceptional patient care while expanding the scope and profitability of their practices. The company continues to grow as a global orthodontic solutions provider by not only providing high-quality products but also going beyond the typical supplier–client relationship, instead cultivating partnerships with its customers so they can deliver positive patient outcomes and maintain healthy, successful businesses.

The company’s wide orthodontic range includes brackets and bands, intra-oral appliances, elastomeric modules, archwires and temporary anchorage devices. Other solutions include innovative orthodontic products and progressive continuing education opportunities to help fuel the growth and success of orthodontic practices in more than 75 countries.

For more than 40 years, Henry Schein Orthodontics has manufactured most of its products in the US, including at its over 6,000 m² corporate building in north San Diego. Among its offerings is the Carriere System, which incorporates the latest advances in orthodontic technology with gentle forces that work with natural physiology to correct a bite at the beginning of treatment. By utilizing the Carriere Motion 3D Appliance in the beginning stage and then transitioning to Carriere SLX Self-Ligating Brackets to complete treatment, the total time in treatment is greatly reduced when compared with conventional approaches.

“Shifting to the Carriere Motion 3D Appliance has been one of the most significant treatment advances I have implemented during the past five years,” said Dr Ron Maddox, an orthodontist based in San Dimas in California. “I’ve been able to reduce the overall treatment time and significantly reduce the time that my patients are in braces.”
Dr. Luis Carrière is the developer of the unique Carrière System, which consists of the Motion Class II Correction Appliance, Motion Class III Correction Appliance and SLX Bracket System.

Dr. John Graham is not just an orthodontist but also an innovator and educator. (Photographs: Henry Schein Orthodontics)

Editorial note: This article originally appeared in the April 2018 issue of Orthotown.
The International College of Dentists (ICD) will celebrate its centennial in 2020. The ICD is the oldest and largest honour society for dentists in the world and was conceived by Drs Louis Ottofy and Tsurukichi Okumura with the vision to start an organisation of outstanding dentists to maintain professional collegiality and friendship, monitor and evaluate the progress of dentistry internationally, and disseminate such information to dentists worldwide. Today, the ICD has 12,000 fellows in 122 affiliated countries. Managing Editor of ortho Nathalie Schüller spoke with Dr Dov Sydney, ICD International Editor and Director of Communications, as well as the Chair of the College Centennial Committee, about his motivation, the college’s success and the 100-year anniversary.

Dr Sydney, tell me how and why you became involved in the ICD.

It was in a manner very typical of the ICD. I had a patient who was a dentist and told me about the voluntary work he was doing for an ICD clinic for blind people. I had no idea then what the ICD was about. He told me more about the ICD and asked whether I would like to become involved in the clinic to help the patients, and based on my background and CV, said he would like to nominate me to become a fellow. That was in 1996 and I was proud to agree. I was active in the Israel District and then moved to the European Section board as regent, editor and website manager. Later, I was asked to serve on the worldwide executive of the organisation as the International Editor and Director of Communications for the ICD.

Are all potential members nominated by fellows and what is the basic requirement to be nominated?

Yes, one has to be nominated by two fellows in good standing. Let’s say a candidate lives in Germany. Two members of the college would have to recommend the person to the German District committee, who, following recommendation from the credential review committee, would pass the recommendation on to the full European Section board, consisting of all 35 European member countries, for a vote on the nomination. The decision would then be passed on to the ICD world headquarters for completion of the process and preparation of certificates. Nominees have to have made major contributions to dentistry in more than one of the following areas: academia or teaching, research, humanitarian programmes, leadership or service projects.

What is your major joy, your main motivation, in being part of the ICD?

As the International Editor and Director of Communications, I see all of the reports and images of ICD events and projects that take place around the world. I have to select the ones that will appear online and in our journal. In a photo from the 2015 issue of The Globe, the ICD journal, one truly sees the kind of impact so many of our projects have on the people who are the recipients of ICD compassion and dedication. It is evident in their eyes—a palpable image of someone’s unselfishness, caring for another human being, some receiving care for the very first time in their lives.

Is dental care the main thing we should worry about in parts of the world that are so destitute?

I recall reporting on a group that went to Nepal to help children in great need of dental care. When the team arrived, they encountered unexpected problems. The community was suffering from mass diarrhoea, a major disease in the Third World. People can become extremely ill and die from not having access to clean running water. The water used to brush the children’s teeth was contaminated. The team developed a programme to bring running water into the village for toilets and sinks for toothbrushing. The rate of diarrhoea went from 75 per cent to 5 per cent. Children were able to go back to school. The adults could work. This is a good example of how ICD dental projects can have a major impact on a community and the overall health of the project site’s population.

How are ICD projects initiated?

There are many kinds of projects. Some are directly funded through the ICD’s Global Visionary Fund. Also, there are 15 sections of the college and they have their own foundations or funds to initiate their own projects. Many fellows are also involved in individual ICD projects. Soon, we will be introducing an interactive map of hundreds of projects on our website where a visitor can see educational projects, student exchange programmes, humanitarian missions and more. We currently have a major programme on antibiotic resistance owing to the fact that antibiotics today are becoming less and less effective. We work with the Centers for Disease Control and Prevention in Atlanta in the US and the World Health
Organization to put on programmes teaching dentists how to deal with antibiotic resistance. We also provide programmes on sepsis and sterilisation.

2020 will mark the 100-year anniversary of the ICD. What are the changes, progress and developments you are the happiest about today?

The fact that we grew from a concept first established by a Japanese dentist and an American dentist meeting a 100 years ago endeavouring to have an international organisation to today, with the largest footprint of any dental honour society in the world, says a great deal. The integrity of the organisation throughout our 100 years in recognising those dentists who truly demonstrate having made major contributions to dentistry and society has been consistent. We are not a very well-known organisation; in fact, many dentists are unaware of the ICD. We realise that, in order to honour our motto of “recognizing service as well as the opportunity to serve” and to be true to the vision of our founding fathers, we do have to make ourselves better known in order to ensure that deserving dentists are recognised by the college.

The centennial is a watershed moment for the college and validates that the ICD core values are sustainable and worthy. The projects, the organisation and the dedication of our members to improving oral health care are only possible because our fellows deeply believe in what they are doing; had they not, the ICD would have disappeared long ago.

I remember a dentist who did not want sponsors because he aimed to stay objective. In financing all these projects and your collaborations with companies, can you still stay independent?

We have various levels of sponsorship. We collaborate with companies like Henry Schein, Modern Dental Group, Dentsply Sirona, Spidert, Hu-Friedy and EMS, as well as organisations like the International Congress of Oral Implantologists, that provide us with their generous support. When we take on a sponsor, it is not as an advertiser, but as a partner in a strategic alliance of shared values. That alliance has various parameters and mutual responsibilities that create a unique symbiotic relationship between the college and our corporate sponsors.

What do you think are the major challenges facing the college today?

All major organisations in dentistry are seeking new members. Some have little or no oversight or require little, if any, performance evidence as a prerequisite to membership, unlike the ICD, whose requirements are considered of the most stringent of all recognition-based international dental honour societies. Quite frankly, some try to imitate how the ICD operates, and why not? The ICD is in the enviable and unique position of having recorded sustained membership growth for the last ten years. We staying relevant and consistently seeking out new and innovative methods to enhance our communications and connection with them. But, with the constant bombardment of information via the Internet and e-mails, there are many challenges and media competition for our members’ attention. We are meeting those challenges with innovative communication packaging, but it’s a constant and unending endeavour.

We have already touched on the ideas of friendship and passion of ICD Fellows. What is the main ingredient of the ICD’s success to you?

Dedication and commitment to ICD core values is the common denominator; ICD Fellows are driven as individuals and as a group to improving dentistry and the life of those being underserved. One sees that everywhere we have an ICD presence.

The celebration of the 100-year anniversary is planned to be a worldwide event; every section, district and region will be holding events. Can you tell us a bit more about what we can expect?

As mentioned earlier, we have 15 sections, 70 districts and 15 regions worldwide, and they will be participating in different ways to acknowledge the 100-year anniversary. Every ICD jurisdiction will have an event during 2020 that will memorialise that special year and will lead up to the very special finale in Nagoya in November 2020. There will be a ceremony in Nagoya in which new inductees from all over the world will participate in an Olympic-style event, in addition to a gala banquet, special entertainment and many surprises!
Planmeca’s digital orthodontic workflow provides unmatched freedom and flexibility. After collecting imaging data, the necessary appliances can be ordered from an orthodontic solution provider or treatment planning can be done in-house with the appropriate software. The choice is yours—our workflow is completely open.

We at Planmeca like to be at the forefront of new technologies, but also understand that many still prefer to work with more conventional tools and methods. We strive to serve all users in the best possible way and to provide several types of solutions and services that add value to everyday dentistry—making clinical work more efficient and satisfying.

A visit to the orthodontist generally begins with an oral examination, with visual inspection of the extra-oral and intra-oral situation performed. Our smile design software allows for quick visual representations of treatment possibilities to also be done.

Once a mutual decision on the orthodontic treatment for the patient has been reached, further clinical records are typically taken. These can include radiographs, such as lateral cephalometric and panoramic images, as well as physical impressions. A clinic with advanced technology might take only 3-D records—ultra-low-dose CBCT images and digital impressions directly scanned in the patient’s mouth. All records can be obtained directly with Planmeca devices and visualised in our software.

When planning a treatment, a cephalometric analysis is usually performed to obtain information about the dentition’s status and its relation to the skull. This is simplified by our software, which performs cephalometric analysis automatically in seconds. Stone model analyses can also be done digitally using intra-oral scans and our model analyser software, which is also a marvellous tool for comparing scans captured at different points in time.

Next, the treatment path best suited for the patient and the clinical indication is determined, including where to obtain the required appliances from. There are many ways to make work easier when using digital impressions. We collaborate with several third-party providers for clear aligners and customised brackets to ensure your preferred company appears in our growing list of supported partners. Our cloud service allows easy and secure sending of digital impressions to a laboratory or external provider.

Alternatively, clear aligners can be designed and fabricated in-house using our software and 3-D printer. This convenient workflow allows the user to include tooth roots from the CBCT scan in the plan and to track their positions while simulating tooth movement. Moreover, for treating early mixed dentition, our LM-Activator appliance is a cost-efficient alternative that benefits clinicians and patients alike.

Orthodontics is closely connected to orthognathic surgery, another area we are rapidly advancing in. When patients need corrective jaw surgery, Planmeca’s powerful tools allow easy and efficient surgical planning using the same software.

With our offering, planning becomes simulation with real-life realisation by the production of surgical splints that are printed on-site and used to transfer the virtual operation to the actual surgery room. The splints and even the entire surgical planning can also be ordered as a service from the Planmeca ProModel surgical planning team.
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Introducing the Carriere SLX 3D Bracket System

When Henry Schein Orthodontics’ highly acclaimed engineers teamed up with world-renowned orthodontists, Drs Luis Carrière, Lou Chmura, Dave Paquette and Jep Paschal, they produced an all-new, patent-pending metal and ceramic bracket system that goes beyond the boundaries of any bracket system we have ever produced. The dedication to practice efficiencies and to advancing the state-of-the-art of patient care will be evident when you experience the beauty, comfort and extraordinary performance of the all-new Carriere SLX 3D System.

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“SLX 3D represents nothing less than a true engineering and design phenomenon. Whether you’re using another self-ligating system, or twin brackets, when you try SLX 3D, you too will be convinced it’s time to switch.”—Dr John Graham

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Survey: What attracted you to the EOS Congress?

By Yvonne Bachmann

This year’s European Orthodontic Society (EOS) Congress was hosted in Edinburgh, Scotland. The event, which gathered around 2,300 orthodontists, aimed to inform the community about the latest developments in the field and traditionally featured a number of prominent keynote speakers presenting their latest research and findings. ortho spoke with congress-goers to learn what makes the event so popular among orthodontists.

Azzah Alhazmi, Sweden
I am a postgraduate student at Karolinska Institutet, a university in Huddinge near Stockholm. Attending this congress is part of our postgraduate programme; all students are here. It’s my first time at the congress and I think it’s really nice. Some of the lectures are really interesting. Summer is also a great time to host this event. I will graduate in 2020, so I think I’ll come back for another EOS Congress.

Dr Roland Zettel, Switzerland
I have my own practice in Teufen and have so far attended four or five EOS congresses over the years. I am now planning to attend every year, as it is a great opportunity to combine education and sightseeing. I attended the opening ceremony and saw the Red Hot Chilli Pipers play. I also went on the Red Bus Tour to Holyrood Palace. The congress has a very relaxed atmosphere and it’s a great event for networking.

Dr Masanori Yasui, Japan
This is my second EOS Congress. I have my own practice in Kawasaki and flew 12 hours to Edinburgh. My research is being displayed in this year’s poster session. I think it’s a great congress. It’s smaller than other congresses, like AAO, but small and compact is good.

Dr Pongsri Brudvik, Norway
I used to work for the University of Bergen. I retired two years ago as a lecturer, but kept working on a private basis for one day a week because I wanted to finish off my patients. I have attended many EOS congresses, probably more than ten. It is always a pleasure to meet other colleagues and get the latest updates in orthodontics. This may be my last congress, as I am now planning to fully retire; however, I have already met a number of colleagues from other countries who have already retired, but are here anyway.

Dr Milla Mörönen, Finland
I work at a public health care centre in Alavus. As I am the only orthodontist in a region of 25,000 people, treating all of its children, I must see what is going on in orthodontics. I need scientific facts to support my own decision-making. I am an EOS member and this is the fourth congress I am attending. After Venice, Warsaw and Stockholm. I think the EOS congresses are always well organised and besides being informative they are also fun. I am already thinking about attending the congress of the World Federation of Orthodontists, which will be held in Yokohama in 2020. I have never been to Japan.
Nice, Hamburg, Oslo, Limassol and Athens to host upcoming EOS congresses

While attendees are still raving about Edinburgh, where this year’s European Orthodontic Society (EOS) Congress was held, the members of the EOS have already planned far ahead. With Nice in France, Hamburg in Germany, Oslo in Norway, Limassol in Cyprus and Athens in Greece, the organisers have chosen to take participating orthodontists to extraordinary places that are world-famous for their flair and hospitality.

In 2019, the EOS Congress will take place in Nice. To be held from 17 to 22 June at the Nice Acropolis Convention Centre, the event will address genetic research, among other topics. In Nice, on the French Riviera, visitors will find various places of interest. The Promenade des Anglais is a pedestrian area that follows the curve of the Baie des Anges beaches. The seaside esplanade is lined with palm trees. Other attractions include the Musée d’art moderne et d’art contemporain [museum of modern and contemporary art], the monastery Monastère Notre Dame de Cimiez and the Colline du Château park.

The 96th Congress of the European Orthodontic Society will be held in Hamburg from 10 to 14 June 2020 and focus on the role of orthodontics and dentofacial orthopaedics and on bones in orthodontics. The venue, the Congress Center Hamburg, is centrally located and enables participants not only to take part in the event’s social programme but also to explore the city and its famous sights on their own. Highlights of the Hanseatic city are the harbour and the famous, only recently inaugurated, Elbphilharmonie concert hall.

“For many, Hamburg is Germany’s finest city—a cosmopolitan host open to change. It is a great honour for me and our organising committee to host this event in Germany for the 12th time,” stated Prof. Bärbel Kahl-Nieke, Director of the Department of Orthodontics at the University Medical Center Hamburg-Eppendorf and EOS President-elect 2020.

For 2021, the EOS is inviting members and non-members to Limassol. From 31 May to 5 June, the Spyros Kyprianou Palais des Sports will be open to international orthodontists looking for educational and networking opportunities. The cosmopolitan hub of Cyprus is located on the Mediterranean Sea and well known for its restored old town centre.

Oslo will be welcoming the orthodontic community in 2022. Although the dates have not been announced yet, regular congress attendees may already want to do some research on the city, which offers a variety of attractions, including the Viking Ship Museum, Norwegian National Opera and Ballet, TusenFryd amusement park, and Holmenkollen ski museum and tower.

Taking place in 2023 in Athens, one of the oldest cities in the world, the 99th edition of the EOS Congress should be on the event list of all orthodontists who are history buffs. Must-see places include the famous Acropolis, a large hill that lies in the centre of the city and contains a cluster of ancient ruins, the Panathenaic Stadium, an ancient multi-purpose stadium that hosted the first-ever Olympic Games in 1896, and Plaka, a historic district of Athens known as the “Neighbourhood of the Gods” with small labyrinthine streets.
BOC interview: “There was a strong emphasis on interdisciplinary care”

By Brendan Day

The 31st British Orthodontic Conference (BOC) is took place in London from 27 to 29 September and featured a number of innovative sessions under the umbrella of the dental specialty. Ortho spoke with BOC 2018 Chairman Dr Richard Jones about the first conference in 1986 and asked him about his 2018 congress highlights.

What did the theme of “Orthodontics 360°” mean for attendees of this year’s BOC?

The theme neatly summed up our goal to not only explore the full circle of orthodontic topics during the congress, but also focus outwardly on the wider dental world that surrounds us and how we can work closer and better with our dental colleagues. Hence, there was a strong emphasis on interdisciplinary care with a number of themed sessions.

Are there any particular speakers or events that you were looking forward to?

It is impossible, and probably unfair, to single out any individual presentations or lecturers, bearing in mind that we have had a record 66 presentations from speakers from home and abroad. We also had a record number of parallel sessions, with three full days of parallel sessions and two half-day sessions running alongside the main scientific programme. There really was something for everyone, with dedicated sessions for therapists, nurses, managers and support staff. There was a large number of dedicated interdisciplinary sessions within the main scientific programme, including presentations on ortho-restorative treatment, orthognathic treatment, the ortho-periodontal interface, the role of orthodontics in the management of temporomandibular joint disorders, and the role and challenges for orthodontics in association with trauma.

There were also themed sessions dedicated to aligner treatment, a modality that is becoming increasingly popular, and also to lingual orthodontic treatment. If I were to highlight one single lecture, it would be the prestigious Northcroft Memorial Lecture. The honour of delivering it fell to the UK’s own Prof. Martyn Cobourne, who discussed his career-long research into craniofacial development.

An essential and very enjoyable aspect of any conference is the networking that accompanies the social programme. This year’s BOC was no exception, with our “Rule, Britannia!” gala reception that took place at Church House, adjacent to Westminster Abbey. The conference-closing black tie banquet, the Glitter Ball, took place at the iconic Connaught rooms in Covent Garden.

How has the BOC developed over the years? Were there any new features at this year’s conference?

This year was the 31st BOC, but, remarkably, the first in London. The very first BOC took place at a hotel in Bournemouth in 1986 and was the first joint venture of the then multiple national orthodontic organisations. The BOC was, in many ways, the precursor to the now unified society that is the British Orthodontic Society. That first conference had a few hundred attendees, but has now grown into arguably the largest specialist dental conference in the UK, with regular attendances of over 1,200 people.

Unlike most large conferences, the BOC is not organised by professional conference organisers, but by a team of society members on a voluntary basis supported by a dedicated HQ team. These teams look to constantly innovate and improve the BOC experience for attendees and this year is no exception. This year, we held the first parallel session dedicated to secondary care with a focus on orthognathic treatment and 3-D surgical planning. TED Talks have taken the business world by storm and so this year we introduced our own take on this with the OrthoTED session, showcasing a number of dynamic short talks with a focus on new technology and how this is influencing education and treatment. With so much to choose from, attendees were hopefully torn in terms of which session to attend. Fortunately, this year we made that dilemma a little easier with the introduction of the BOC catch-up session, in which video recordings of many presentations were shown in a cinema-style session at a later time during the conference.
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16th Congress of the Turkish Orthodontic Society
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www.aaoinfo.org/meetings

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https://aeeec.com/aecd-dubai-world-orthodontic-conference-2018

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