“We have seen a tremendous growth in the number of attendees”

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 worldwide 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.

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 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.

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

“We can also learn from seeing cases that have failed.”

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.

How many visitors do you expect to attend the meeting?

We are expecting 350 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 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

“We can also learn from seeing cases that have failed.”

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.

How many visitors do you expect to attend the meeting?

We are expecting 350 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 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

“We can also learn from seeing cases that have failed.”

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.

How many visitors do you expect to attend the meeting?
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 Markets and Markets 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$4.71 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, Dentaltown, Sirona, American Orthodontics, Rocky Mountain Orthodontics, G&H Orthodontics, Dentalauer and TP Orthodontics.

The full report, titled Orthodontic Supplies Market by Removable & Fixed Braces (Brackets [Self Ligating, Lingual, Metal, Ceramic, Aesthetic]), Archwire (Nickel Titanium, Stainless Steel), Ligature (Elastomeric Wire), Anchoring 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”

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.

Dr Graham Gardner at the first EAS congress last 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.

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.
4) 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.

5) Improved maintenance of oral hygiene and no dietary restrictions, as the aligners are removed for eating.
6) Broken brackets and emergencies are things of the past.

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.

The first EAS AlignerLab is set to take place in Vienna in February. What prompted the EAS to hold this event?

Dr Gardner: “Aesthetics and evidence” this year.

The event will be held in the Hilton hotel in Brisbane. 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 specialty’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.

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.

Is the AlignerLab a one-off thing or is it intended to become a regular event?

We hope this will become a regular event because technological developments and advances will continue. Thus, an event at which practitioners can both make direct comparisons and trial new systems should become a popular and regular occurrence.

The event’s keynote speaker will be Prof. Henry Fields, the Vig/Williams Endowed Division Chair of Orthodontics at the 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.

Brisbane is set to host the Australian Society of Orthodontists’ Foundation for Research and Education’s 2017 Foundation Meeting.

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.

We hope this will become a regular event because technological developments and advances will continue. Thus, an event at which practitioners can both make direct comparisons and trial new systems should become a popular and regular occurrence.

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?

Dr Gardner: “Aesthetics and evidence” this year.

The event will be held in the Hilton hotel in Brisbane. 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.

We hope this will become a regular event because technological developments and advances will continue. Thus, an event at which practitioners can both make direct comparisons and trial new systems should become a popular and regular occurrence.

The event’s keynote speaker will be Prof. Henry Fields, the Vig/Williams Endowed Division Chair of Orthodontics at the 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.

Brisbane is set to host the Australian Society of Orthodontists’ Foundation for Research and Education’s 2017 Foundation Meeting.

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.

We hope this will become a regular event because technological developments and advances will continue. Thus, an event at which practitioners can both make direct comparisons and trial new systems should become a popular and regular occurrence.

The event’s keynote speaker will be Prof. Henry Fields, the Vig/Williams Endowed Division Chair of Orthodontics at the 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.

Brisbane is set to host the Australian Society of Orthodontists’ Foundation for Research and Education’s 2017 Foundation Meeting.

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.

We hope this will become a regular event because technological developments and advances will continue. Thus, an event at which practitioners can both make direct comparisons and trial new systems should become a popular and regular occurrence.

The event’s keynote speaker will be Prof. Henry Fields, the Vig/Williams Endowed Division Chair of Orthodontics at the 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.

Brisbane is set to host the Australian Society of Orthodontists’ Foundation for Research and Education’s 2017 Foundation Meeting.

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.

We hope this will become a regular event because technological developments and advances will continue. Thus, an event at which practitioners can both make direct comparisons and trial new systems should become a popular and regular occurrence.

The event’s keynote speaker will be Prof. Henry Fields, the Vig/Williams Endowed Division Chair of Orthodontics at the 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.

Brisbane is set to host the Australian Society of Orthodontists’ Foundation for Research and Education’s 2017 Foundation Meeting.
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.
Ortho Tribune Study Club

Join the largest educational network in orthodontics!

www.OTStudyClub.com

- education everywhere and anytime
- live and interactive webinars
- a focused discussion forum
- free membership
- no travel costs
- no time away from the practice
- interaction with colleagues and experts across the globe
- a growing database of scientific articles and case reports
- ADA CERP-recognized credit administration
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 internationally 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, 18 In those endeavours, a series of articles were published suggesting innovative treatment options with various adjuncts to clear aligners.19–21, 23–24

A set of instruments were created specifically for clear aligners in order to enhance, accent and increase the spectrum of applicability and acceptability of this form of aesthetic orthodontic treatment. Clear Collection consists of four instruments designed to individualise aligners to address specific treatment needs.22–24

Clear Collection

As understanding of some of the limitations of clear aligner applications came to light, alterations to biomechanics, materials and treatment planning were introduced. The primary aims were to improve the predictability of specific tooth movements and to expand the scope of treatment to a wider variety of presenting malocclusions.

Limitations of clear aligner treatment enhanced with Class II inter-maxillary elastics and Class I intra-maxillary elastics attached to mini-screw anchors to support the elastics (Fig. 5). 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). 16–20

The Tear Drop

The Tear Drop instrument is used to add a notch or hook in the gingival margin of aligner plastic for the application of typical orthodontic elastics.23, 24

The Hole Punch

The Hole Punch instrument is used to create a half-moon cut-out in the margin of clear aligners to retain orthodontic elastics for various applications. —Fig. 3. Class II clear aligner treatment enhanced with Class II inter-maxillary elastics and Class I intra-maxillary elastics attached to mini-screw anchors to produce the intended vectors of force — Fig. 4a & b. The Hole Punch is used to cut a half-moon of plastic at the aligner margin to clear the way for bonded buttons or brackets in order to correct orthodontic elastics or elastomeric chains. — Fig. 5. Cutting elastics used to improve posterior intercuspation in finishing aligner treatment. The Hole Punch cleared plastic to permit bonding of buttons for the inter-maxillary box elastics. 19–21, 23–24

Areas of gingival impingement or irritation from clear aligners can be cleared using the Hole Punch to remove plastic. — Figs. 6a & b. The Vertical instrument produces a shallow indent in the plastic to accent rotational couples on individual teeth. — Fig. 8. The indents from either the Vertical or the Horizontal pliers may be formed immediately adjacent to attachments to accent the contact point of plastic in the right angle between composite and tooth, with the intention of increasing the effectiveness of the attachment. — Figs. 9a & b. Adding root torque to specific teeth is enhanced by creating indents with the Horizontal pliers. The same tool may also be used to increase the retention of aligners or clear retainers. — Fig. 10. Aligner lag or loss of tracking is a common occurrence, especially for maxillary lateral incisors, the least predictable tooth movement. The air gap is a symptom of ill-fitting aligners and may have a number of causes (e.g. poor compliance, insufficient space created for the tooth to follow and lack of surface area contact with plastic).
at the gingival margin of aligner plastic. 11a, 11b The intention is to relieve the plastic to permit the application of bonded buttons or brackets on specific teeth to support orthodontic elastics or chains. These cuts can be placed wherever needed along the aligners on either buccal or lingual surfaces. A common scenario would be punching holes in the bucal margin of plastic at the maxillary and mandibular first molars and canines to bond buttons to support seating or box elastics (Fig. 10a) or cutting a half moon on both the lingual surface of the maxillary first molar and bucal surface of the mandibular first molar to facilitate the use of a through the bite cross bite elastic.

In addition, the Hole Punch may be employed to simply clear plastic away from impinging gingival tissue anywhere along the aligners. 12 The incise papilla is a common location for this type of irritation that can be quickly resolved by clipping the plastic that is in that area for each tray in a series (Figs. 6a & b).

**Individualising aligners with accent pliers**

Two accent pliers round out the Clear Collection. These unique instruments were designed to enhance specific types of tooth movements by increasing plastic contact points in precise locations for individual teeth. The intent is to increase the predictability of tooth movements by creating shallow indents in the plastic to augment prescribed mechanical control. Most importantly, these pliers are not heated. In addition, these indents may be produced to increase the retention of aligners or clear retainers in undercuts and at line angles.

The Vertical

Controlled rotations of teeth are often difficult to achieve with aligners, 13, 14 as the computer-generated prescribed movement may not be translated accurately to the tooth. The first of the two accent pliers is called the Vertical 19–21, 24 and it is used to gently impress a vertical indent into the aligners in a specific location in the lingual and/or facial plastic for an individual tooth (Figs. 7a & b). Rotating maxillary lateral incisors and canines are often sites of these types of problems. 15, 16 As an example, the rotated lateral incisors in Class II Division 3 malocclusions are difficult to correct and typically require that overcorrection be designed into the aligners at the outset. If additional rotation is indicated, an indent can be placed in the plastic at the mesial line angle on the facial surface and the distal line angle on the lingual surface to create some extra force in the form of a rotational couple in a series of aligners. 14 This may preclude the necessity of another round of refinement appliances to achieve the intended goal. If a composite attachment is in place on a specific tooth, the Vertical can be used at the right angle contact of the aligner and the composite to sharpen the contact point in that location for more efficient transmission of force to the tooth (Fig. 8).

The Horizontal

The second accent instrument is the Horizontal 18, 24 and it is primarily used to produce an indent to affect a change in tooth root rotation or torque. 17, 18, 24, 25 A horizontal indentation into the plastic at the gingival margin of the aligners will emphasize the force applied to torque the roots of individual teeth (Fig. 9a). These horizontal indents can also be placed at the right-angle junction of a composite attachment and the tooth to engage the contact, thereby increasing the effectiveness of the intended tooth movement and reducing the risk of the plastic slipping away. Another option is to place horizontal indents at the marginal undercuts of the crown of the teeth to increase the retention of aligners or retainers (Fig. 9b).

**Common applications: Heating 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 dental/ocular compensation (i.e. Class II, Class III, resolving deep and open bites, extrac- tion space closure, etc.) 17, 18, 24, 25 a common application for the Tear Drop and the Hole Punch is establishing bootstrap mechanics. 26, 27 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 22–24, 28, 29 (another of our creations from our private practice; DENTSPLY Raintree Exiso) 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 28, 29. 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. 12c). The Tear Drop is used to create two elastic notches at the mesial and distal gingival embrasures (Fig. 12d). A small-diameter orthodontic elastic is then applied to either the tear drop 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.

**Future view on aligners**

As demand by patients for more comfortable, hygienic and aesthetic treatments increases, the clear aligner market will respond with more advances and alternatives. In addition, orthodontists will learn to use these envelope of applications by adding adjucts to improve the effectiveness and ultimately the predictability of treatments with aligners. Much like fixed appliances, the ability to individualise, accent and enhance clear aligner biomechanics reduces the known limitations of aligners and the associated clinical frustrations of the orthodontist. Managing alterations of series of aligner trays in real time (including the use of a Clear Collection prescription form), 28 Fig. 15 provides increased flexiblity in the endeavour towards increased predictability of aligner orthodontic outcomes.
MIS is a global leader in the development and production of advanced products and innovative solutions aimed to simplify implant dentistry. Successfully sold and distributed in over 65 countries worldwide, MIS provides unparalleled service to our customers. To learn more, visit our website: www.mis-implants.com