Summaries of Publications

Rainer-Reginald Miethke

The hybrid approach: A solution to overcome unpredictable movements in clear aligner therapy

Lombardo L, Albertini P, Siciliani G.
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Introduction

The current popularity of clear aligners is based on the superior aesthetics and comfort they offer. Adults, children and adolescents appreciate devices that are unobtrusive in appearance when undergoing orthodontic intervention. All aligner systems have developed remarkably in recent years, with improvements made in terms of materials, procedures and adjuncts. They are now able to generate optimal forces and moments that guarantee excellent biomechanical performance. Although clear aligners have become a widely applicable option, they still require sensible selection of a suitable patient. This patient will most likely be one who does not require extraction of any permanent teeth. If the orthodontic intervention is more challenging, fixed appliances are yet superior to removable aligners. This fact has been confirmed by other publications including one meta-analysis. Everything, though, depends on the tooth movements planned; however, the software will replicate every movement that is requested regardless of whether it can be accomplished with plastic splints or not, even if it will only be achievable in combination with orthognathic surgery. As such, no digital treatment plan/prediction should be accepted without critical examination. To a certain extent, aligner experts agree on tooth movements that are feasible with aligners and those that are categorically not. There is no question that anterior crowding can be corrected successfully and posterior teeth moved distally some 2.5 mm with aligners, but any bodily buccal expansion of lateral teeth, rotation of canines and premolars, extrusion of maxillary incisors and control of vertical overlap (deep/open bite) will not be reliably and efficiently corrected using this type of appliance.

In situations like extraction therapy and those involving complicated tooth movements, it seems reasonable to return to and rely on fixed (lingual) appliances. Because these devices will impact the patient's appearance, an acceptable compromise could be to assign all difficult movements to

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partial fixed braces and resolve everything else with clear aligners.

This publication is centred on hybrid solutions in which fixed multibracket appliances undertook tasks that would have been less predictably accomplished by aligners.

Correction of tooth rotations

Derotations depend to a large extent on the morphology of the affected tooth and therefore the first contact between the aligner and the tooth surface. The relevant literature is generally in agreement regarding the teeth for which rotational movements are most difficult to achieve: canines and premolars. Only about one-third of the programmed rotation can be effectually accomplished; this is in stark contrast to incisors due to the flatter configuration and greater mesiodistal width of the latter. For the aforementioned reasons, in the hybrid approach fixed appliances will be used which alternately will lead to fewer aligner attachments and aligners overall. Ultimately, these partial fixed braces reduce the treatment duration. The heavily rotated tooth and its neighbours are concretely bonded with tubes. A precise impression is then taken and the space for a wire (e.g., 0.013-inch CuNiTi) and the derotation are blocked out on the setup before the aligners (in this case F22 Sweden & Martina, Due Carrare, Italy) are thermoformed. In the example shown, the rotation was completely corrected after 4 months, and other symptoms were dealt with simultaneously.

Correction of maxillary constrictions

The specialist literature is again quite united in the view that transverse expansion is problematic to manage with aligners, particularly if bodily movements are intended, and even more so if the amount of expansion exceeds 2.0 to 3.0 mm. This implies that in situations where the crowns of posterior teeth are inclined palatally, aligners are the treatment option of choice. In all other circumstances, effective and efficient bodily expansion should be attempted with rapid maxillary expansion with (primarily in adults) or without miniscrew anchorage. Especially if miniscrew supported, the expander can be left in place and regular aligner therapy can still take place.

Correction of distoocclusion

According to the common orthodontic opinion, in Class II patients, maxillary posterior teeth can be consecutively moved 2.25 mm distally in 0.25-mm increments with the appliance being replaced every 2 weeks. This could be sufficient if the distoocclusion does not exceed a maximum of half a cusp. If larger, movement of arch segments or the Carriere Motion Appliance (Henry Schein Orthodontics, Carlsbad, CA, USA) with Class II traction are preferable. Ultimately, even miniscrews or pendulum devices should be considered. Progress can be accelerated if the wisdom teeth are extracted because this induces a regional acceleratory phenomenon. In any case, the final detailing is taken care of by aligners.

Correction of mesioocclusion

According to these authors, there are no known examples of treatment of Class III patients in which the mandibular posterior teeth have been pushed distally and the maxillary lateral teeth simultaneously relocated mesially. An approximation of this approach is the use of Class III elastics with clear aligners mainly if the mesioocclusion is not severe. In more serious situations, however, the hybrid technique requires traditional or skeletally anchored rapid maxillary expansion in combination with some type of facemask. After the occlusion is corrected, including a regular anterior vertical overlap, treatment can be continued with aligners. An impressive example is presented in this paper.

Correction of deep/open bite

The orthodontic literature expresses doubts as to whether achieving significant amounts of pure vertical movement (intrusion/extrusion) with aligners is feasible. Thus, what is often presented as an adversary 'proof' is merely a reflection of concomitant protrusions or retrusions. This means that any bite raising is in fact often the effect of a protrusion of the mandibular anterior teeth. What holds true for intrusions is even more the case for extrusions because only some 30% of the intended elongation is actually visible at the termination of therapy. The likely reason for the devi-

ation is the insufficient grip of aligners on the individual teeth. The corrections of open bites that have been observed thus far are every so often counterfeited by palatal tipping of the incisor crowns.

To enhance the desired movements if only a few teeth are affected by an incorrect vertical position, tubes can be bonded at different heights (!). Again, the area of the brackets/tubes, the (CuNiTi) wire and the space required in the direction of movement must be blocked out. Beyond this, the aetiology of the vertical problem must be uncovered and addressed in the treatment plan.

Summary

To increase the predictability of aligner treatment if problematic tooth movements are involved, a hybrid approach with partial (lingual) fixed appliances is advisable. This technique may shorten the total treatment duration without a noticeable increase in cost.

Commentary

For the following comment, two ideas crossed this reviewer's mind. Both are a consequence of the recently closed 1st Virtual Congress of the German Association for Aligner Orthodontics (DGAO), which was a tremendous success with over 720 registrations (Schwarze Konzept, Stephanie Schwarze, Cologne, Germany). One of the many interesting lectures was given by the Viennese orthodontic specialist Dr Dietmar Zuran, with the striking title "All aligners are equal – but some are more equal than others…". In his presentation, Dr Zuran demonstrated what the most popular aligner systems currently offer, but even more eye-opening was his list of demands that are still to be fulfilled – an orthodontic requirements specification sheet, so to speak. For this reviewer this implies that yes, the advanced aligner companies are already very good and the orthodontic community appreciates their systems, but there is still considerable room for improvement so that the individual software can deliver all the applications an experienced clear aligner provider wishes to have at their disposal. In short, what is really needed is not the umpteenth generation of something, but greater choice/freedom in the function of the software rather than the hardware.

Generally, aligner companies want to make their customers believe that their proprietary system can correct every malocclusion without exception. This is time and again 'proven' in 'case presentations' by speakers who often have a certain (financial) relationship with the individual aligner manufacturer. Every clear aligner veteran, however, recognises that the one example/few examples are more exceptions than what can be practically expected in daily office routine. There is no doubt that the orthodontic fabric can be stretched to its maximum with innumerable aligners and endless additional aligners (case refinements). In other words, efficacy might exist, but not realistic effectiveness and efficiency; however, in this author's opinion, this, the optimal indicated and within biological limits fastest treatment, is what we owe those who come to us to for treatment of their orthodontic problem(s).

Fortunately, this commentator is not alone in his belief. He felt very much assured when listening closely during the 1st Virtual Congress of the DGAO to the lecture by Dr Achille Farina entitled "Efficient hybrid aligner treatment: When and how to apply this approach". Dr Farina is a specialist from Brescia, Italy who impressively elaborated why it is no disgrace to combine aligners with (partial) fixed lingual appliances. The presentation given by Dr Tommaso Castroflorio, Vice-Chair of the Specialisation School in Orthodontics at the University of Turin, took the same direction as Dr Farina's discourse. Both specialists can be considered excellent orthodontists with decades of experience in clear aligner therapy.

The aforementioned 'one example' reminds this critic of one of his own, many years ago: he planned the treatment for a teenager with a slight distoocclusion, some rotation and moderate crowding in the maxilla and mandible. He bonded the brackets and ligated the first wire. The patient left the office and forgot the orthodontist as he (and his excellent assistant) forgot the patient. One year later, during a routine control of patient records, he came across the file for this young woman. Flabbergasted, he asked his assistant to immediately make an appointment for the poor patient. She came and had no complaints, and her teeth were all perfectly straight so the fixed appliance could be removed on the spot. Orthodontic therapy was completed in two visits. Is this reality? Did it happen because the orthodontist was so good, his brackets so superior, his bonding so outstanding, his one wire so unmatched? No, it was undeserved

good fortune accompanied by other positive facts. In short: every orthodontist (who is honest with themselves) has this one 'case' where they failed in many aspects and yet the treatment was successful. Beyond this, all orthodontic appliances have an optimal indication. That is why every capable orthodontist should have more arrows in their quiver. That is why it often takes 3 years of specialist training to become an orthodontist, and undoubtedly a lifetime to become a fairly decent one.

Quantitative evaluation of implemented interproximal enamel reduction during aligner therapy: A prospective observational study

Kalemaj J, Levrini L.
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Introduction

The excitement around aligner therapy has increased the relevance of interproximal reduction (IPR), as the latter is one of the most frequently used methods to generate the space required to correct existing crowding. In contrast to IPR, sagittal and transverse expansion of the dental arches are limited by the available cortical bone. Another alternative is tooth extraction, but this entails the significant drawback of consistently creating excess space. IPR can also help to correct any anterior or overall Bolton discrepancy. The total space gained by IPR can amount to almost 10.0 mm in the mandible if it is predominantly the mesiodistal width of the premolars and molars that is reduced. Another benefit is that the intercanine distance can remain unchanged, as can the incisor inclination. Furthermore, it is feasible to opt for IPR to correct embrasures between adjacent teeth (black triangles) or, better still, avoid their development, particularly in truncated and/or periodontally compromised teeth that will additionally benefit from an increase in interradicular spongious bone volume.

If carried out using the correct method and with control of the patient's oral hygiene, IPR is completely harmless to all dental tissues even in the long term. IPR techniques are numerous and range from the use of handheld abrasive strips to machine-driven blades/discs/disc segments. IPR is exceptionally helpful in aligner treatment primarily to guarantee an optimal splint fit and thus ultimately the intended outcome, including tight interproximal contacts. Precise in vivo execution (i-IPR) of the virtually planned (p-IPR) slenderising is therefore essential. These two types of reduction can be compared using a subroutine Bolton analysis in the ClinCheck software (Align Technology, San Jose, CA, USA).

The primary goal of this investigation was to compare p-IPR to i-IPR under typical clinical circumstances, and its secondary aim was to establish the causes of any discrepancies between the two.

Subjects and methods

The sample for this clinical study consisted of 50 consecutive Invisalign patients who were treated by six different practitioners (each contributing between five and ten individuals). All patients underwent Invisalign Lite or Comprehensive treatment in the maxilla and mandible including IPR in the anterior and/or posterior segment, in some cases only in one arch. The inclusion criteria were no periodontal pathology, cooperation with all treatment requirements and no restorations during aligner therapy. The practitioners' level of experience (years practising/number of patients treated with aligners) was classed as either moderate (n = 4) or extensive (n = 2). The moderately skilled practitioners variably used handheld strips, burs or machine-driven strips for enamel removal. Most used measuring instruments to control the amount of hard tissue eliminated. The more experienced practitioners performed IPR either with burs or manual strips, and only one of the two used a space measuring gauge.

In all cases, impressions (manual or digital) were taken at the beginning of (t0) and after discontinuation of use of the initial set of aligners (t1 = end of treatment/start of refinement). All impressions were converted into digital ClinCheck models. On these, the mesiodistal width from the second premolar to the second premolar in the maxilla and mandible was measured using the Bolton tool in the

ClinCheck software. Thus, the i-PPR was calculated assuming that the width of two adjacent teeth was reduced equally unless precluded by specific circumstances (e.g., macrodontic teeth, prosthetic restorations).

The normality of the data distribution was controlled with a Shapiro-Wilk test, then standard descriptive statistics (mean, median, standard deviation) for data related to characteristics of the patients (affected arch and teeth) and practitioners (experience, impression/IPR tool and measuring device used) were calculated. A Wilcoxon signed-rank test was applied to examine the deviation between p-IPR and i-IPR. Finally, the three IPR techniques were subjected to a Kruskal-Wallis test whereas, due to data clusters, the variation between i-IPR and p-IPR on the one hand and IPR techniques, measuring tools, specialists' experience, impression methods and slenderised teeth on the other was studied using a multilevel multiple regression analysis. The reliability of the Bolton analysis tool in the ClinCheck was tested (calculation of intraclass correlation coefficient) by comparing the mesiodistal width of teeth that were spared from IPR. The level of statistical significance was set at $P = 0.05$.

Results

The sample size was based on an initial calculation with an additional 10% individuals to compensate for those who might be lost during the lengthy investigation. The reliability of the Bolton measuring function was high (mean difference 0.06 ± 0.02 mm), leading to an intraclass correlation coefficient of 0.98 with no noteworthy variation between the two impression techniques.

The mean age of the cohort was 31.4 ± 10.5 years (range 16 to 63 years). The majority were female (n = 36) and less than one-third (n = 14) were male. A total of 27 patients were treated with Invisalign Lite and 23 with Invisalign Comprehensive. IPR in the maxilla was planned for 43 patients (≙ 227 teeth) with a mean of 0.25 ± 0.13 mm, and in the mandible for 38 individuals (≙ 237 teeth) with a mean of 0.28 ± 0.12 mm. IPR in both the maxilla and mandible was carried out in 33 participants. It was scheduled either at the beginning of (n = 24, ≙ 231 teeth) or after arch alignment (n = 26, ≙ 233 teeth). Digital impressions were taken in 38 out of 50 cases. Unit-driven discs were used in 106 teeth, manual strips in 139 teeth and burs in 219 teeth.

The mean disparity between p-IPR and i-IPR was −0.15 ± 0.14 mm; in other words, i-IPR was generally and significantly less than p-IPR. Large deviations were observed, however, since the situation ranged from −0.43 mm (shortfall) to 0.50 mm (excess). The biggest and most significant discrepancies became apparent with use of manual strips for IPR and the smallest when burs were employed. Relating this to the individual tooth groups, it became obvious that the targeted IPR most often fell short in the mandibular canines, specifically when compared to the maxillary canines and premolars in both arches.

What held true for the different tooth groups could not be substantiated when the entire dental arches were contrasted. The side of the tooth that was scheduled for IPR made a difference, however: on the distal side, the intended value was obtained less exactly than on the mesial aspect. The practitioner's level of experience and impression method used and the patient's sex or age did not have an impact on the disparities between p-IPR and i-IPR; however, the discrepancy decreased if a measuring device was utilised. Finally, it was proven that the programmed IPR was closer, but not significantly, to the realised one if the teeth were aligned prior to slenderising. To describe this course of action, the authors of this study themselves used the term "round tripping".

Discussion

Initially, the authors highlight the fact that this was a clinical study, i.e., it did not take place under controlled conditions but in typical practice environments. The finding that i-IPR was generally smaller than that predicted by the ClinCheck is confirmed by other investigations. When this discrepancy was severest in the mandibular canines, this may have been due to the fact that they are frequently tipped forwards, distorotated and in close contact with their neighbouring units. On the other hand, if the mandibular premolars were very precisely reduced in size, this could be because IPR was seldom prescribed for them; this again was most likely based on the desire not to change the posterior occlusion.

If the discrepancy between p-IPR and i-IPR was greatest when the enamel was reduced using manual abrasive strips, this is not overly surprising given that this procedure is quite painstaking, especially in posterior teeth. Another

factor might be the separating effect that arises when the strip is forced into the contact area and the affected teeth yield slightly, giving the illusion of existing space. The greater precision when performing IPR with subsequent control of the created distance with a measuring gauge does not require any further comment. The improved performance of IPR after initial alignment (round tripping) is a consequence of the increased accessibility of the interproximal spaces but comes at a biological 'price', potentially leading to more frequent root resorption.

In their study, these authors regarded a discrepancy of 0.15 mm as clinically significant. This was because the minimum prescribed amount of IPR between two teeth ordinarily amounts to at least 0.20 mm. Overall, the observed failure to complete the IPR prescribed by the system was minor and not fundamentally influenced by practitioner or patient characteristics. The strength of this typical multicentre clinical study is also one of its limitations because it involved many confounding personal and technical variables. One can also question the precision of the Bolton subroutine measuring tool.

Summary

- The outcome of this clinical study was that clinicians most often fail to attain the exact amount of IPR originally planned in the ClinCheck system. The general tendency was to remove less enamel than foreseen during the virtual treatment simulation.
- The mandibular canines were the teeth where the discrepancy between virtual and factual reality was greatest. The same was true if only the dimension of the distal tooth surfaces needed to be reduced.
- IPR was most frequently carried out with burs. Using these cutting tools also led to the smallest deviations between i-IPR and p-IPR.

Commentary

Overall, this paper offers a look into the daily work of our colleagues in Italy where they cook with water – like everywhere in the world. They use different pots (IPR techniques), are a bit more accurate or relaxed (IPR control), but ultimately get what they wanted – boiling water (a patient with an aesthetic smile). But is that the final truth? Almost certainly not, because it looks as though the patients/practitioners were every so often not satisfied and requested additional aligners ("… after the first set of aligners…"). Was insufficient IPR one cause, one of the main causes, or indeed the main cause for the second phase of treatment? It would also be interesting to know how completely the results of therapy would meet the requirements of a Board Certification if the amount of IPR matched that suggested by the Invisalign system exactly, and how good these results were in cases where the real IPR deviated significantly from that calculated by the system. Just a few initial questions.

The authors then state: "Therefore, IPR in adult patients seems to have a positive effect on interradicular bone volume, particularly in the presence of periodontal bone loss." Reading this, this reviewer was shocked to realise that he had become so old and yet was not aware that performing IPR would increase the bone volume between the affected teeth. He would actually have expected the opposite (i.e., that there would be a negative effect on the bone between roots), because originally anterior teeth in particular can be sagittally staggered, which allows for more space between their roots than if they are lined up next to one another like fenceposts. Reading the quoted reference increased this commentator's confusion since he noted: "Overall, treatment of adult crowding using Invisalign and IER, particularly in patients with severe conditions (with periodontally high-risk dentition), appears to have a positive effect on the interradicular bone volume, at least in adult female patients. The effect is also apparently **independent of IER** (bold emphasis by this author)"[1].

In the second reference, a statement is found that proves more the inverse than what this article's authors used the quote for: "Drawbacks (of IPR – this author) are marginal bone loss and periodontal damage, especially if the distance to adjacent tooth roots is under 0.8 mm [44]"[2].

Furthermore, it should be commonly agreed that volume is a 3D entity, and should thus be described by a dimension to the power of three. Also, in the text by Hellak et al[1], the word 'volume' only appears sporadically, but the term 'distance' is found regularly, measured in millimetres. In short, distance can be captured/comprehended easily – in contrast to volume which is far more demanding to compute and understand.

Again, this critic and perchance his readers will conclude: learning/acquiring new/better knowledge never ends. In the old thriller "Altered States", the scientist (!) Eddie Jessup drops this hint: "The final truth of all things is that there is no final truth. Truth is what's transitory. It is human life that is real."

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Periodontal parameters in adult patients with clear aligners orthodontics treatment versus three other types of brackets: A cross-sectional study

Mulla Issa FHK, Mulla Issa ZHK, Rabah AF, Hu L.
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Introduction

One of the main motivations for patients to consider orthodontic treatment is to improve their appearance and smile. Standard therapy with fixed braces, metal wires and various unavoidable auxiliaries makes oral hygiene quite demanding. If inadequate, the intervention can severely affect the periodontium and ultimately the enamel due to plaque and a subsequent change in the oral bacterial flora. Thus, healthy tissues are a prerequisite for successful orthodontic treatment. Plaque adhesion is a corollary of electrostatic interactions and the Van der Waal forces depending on the retention capability of the surface structure for microbiota.

There are typical physical and clinical disparities between different brackets that influence the extent to which biofilm is accumulated. The general understanding is that self-ligating (SL) brackets retain less debris than conventional metal (CB) and conventional ceramic (CCB) ones because the elastomerics used to attach the wire are the main source of pollution. When comparing bracket-based braces to aligners, it must be acknowledged that clear aligners cannot be the appliance of choice in every instance when orthodontic therapy is required.

Since these authors thought there were not sufficient data regarding how conventional and self-ligating braces plus clear aligners relate to each other periodontically, they sought to analyse this by means of seven gingival parameters.

Subjects and methods

This was a cross-sectional study on 80 orthodontic patients (40 men, 40 women) treated and monitored at different hospitals between December 2015 and February 2016. The sample was divided into four groups of 20 patients according to the type of appliance with which they were treated:

- Group 1: Conventional edgewise metal brackets with steel ligatures (Equilibrium 2, Dentaurum, Ispringen, Germany); 7 men and 13 women, mean age 26.7 ± 5.2 years.
- Group 2: Conventional ceramic brackets, ligation mode not mentioned (steel ligatures?) (Damon Clear Smile, Ormco, Orange, CA, USA); 11 men and 9 women, mean age 27.7 ± 8.2 years.
- Group 3: Self-ligating brackets (Tomy International, Tokyo, Japan); 10 men and 10 women, mean age 26.9 ± 5.2 years.
- Group 4: Clear aligners (AngelAlign, Shanghai, China/ Invisalign, Align Technology, San Jose, CA, USA); 12 men and 8 women, mean age 26.9 ± 4.8 years.

The inclusion criteria were age ≥ 18 years, skeletal Class II or III and at least 6 months in therapy with fixed braces in the maxilla and mandible. The exclusion criteria were smoking, pregnancy, diabetes, circulatory disease, medication that could affect the gingival status, use of disinfectant solutions or mouthrinses in the last 6 months, recent peri-

odontal interventions, and extensive restorations close to the gingival margin.

The assessed periodontal parameters collected by just one calibrated examiner were Plaque Index (PI), Gingival Index (GI), Gingival Bleeding Index (GBI), Sulcus Bleeding Index (SBI), Papillary Bleeding Index (PBI), Basic Periodontal Examination (BPE) index and bleeding on probing (BOP).

For statistical purposes, standard data (mean, standard deviation) were calculated. A multivariate and Bonferroni correction were also implemented ($P < 0.008$).

Results

The mean values for the individual indices and information about significance found were as follows:

- PI: Group 1 = 1.7, group 2 = 1.6, group 3 = 1.5 and group 4 = 0.2; groups 1, 2 and 3 were significantly higher than 4.
- GI: Group 1 = 1.3, group 2 = 0.9, group 3 = 0.8 and group 4 = 0.0; the differences between groups 1 and 3, 1 and 4, 2 and 4, and 3 and 4 were significant.
- GBI: Group 1 = 11.3, group 2 = 4.2, group 3 = 0.7 and group 4 = 0.0; the differences between groups 1 and 2, 1 and 3, 1 and 4, 2 and 3 and 2 and 4 were significant.
- SBI: Group 1 = 1.9, group 2 = 1.3, group 3 = 0.5 and group 4 = 0.0; the differences between groups 1 and 3, 1 and 4 and 2 and 4 were significant.
- PBI: Group 1 = 1.6, group 2 = 1.2, group 3 = 0.5 and group 4 = 0.0; the differences between groups 1 and 2, 1 and 3, 1 and 4 and 2 and 4 were significant.
- BPE: Group 1 = 2.2, group 2 = 1.1, group 3 = 0.1 and group 4 = 0.0; the differences between groups 1 and 2, 1 and 3, 1 and 4, 2 and 3 and 2 and 4 were significant.
- BOP: Group 1 = 0.7, group 2 = 0.1, group 3 = 0.3 and group 4 = 0.0; there were no significant differences between any of the groups.

Discussion

Somewhat repetitive is the information that overall, the plaque level/height for each of the seven periodontal indices was highest with standard metal braces, particularly in comparison to clear aligners. This can be easily explained by the difference in retentive elements used/oral hygiene impediments encountered, as also noted in previous publications. No disparities were seen for BOP, and the authors explain this as being due to "patient compliance of hygienic instructions", without explaining what these instructions were. They also attest that clear aligner treatment produces "better results aesthetically and functionally" – a statement that cannot be substantiated by any passage in the text. If self-ligating brackets fared better than conventional attachments, this is a consequence of the "[lower] number of modules needed to hold the brackets as well as less angels and wings". The clear aligner group comprised the highest number of female patients; information about the possibility of choosing a specific appliance/the reason for any preference (costs?) is almost completely concealed in the script.

The authors finally point out that their investigation was the first to assess the BPE index. They think the limitation of their study is the fact that "... the number of patients with [clear aligners] is less because of the higher cost of such treatment", which again is hard to understand because each of the four groups consisted of 20 individuals.

Summary

Clear aligners and, to a somewhat lesser extent, self-ligating brackets result in higher periodontal index scores. The predominance of self-ligating brackets over traditional ones is due to the reduced size of the former and their absence of paraphernalia. Clear aligners allow for optimal oral hygiene during orthodontic treatment and are therefore recommended.

Commentary

A publication with an enormous quantity of numbers and very decorative pictures and yet the overall verdict has to be: "much ado about nothing" (Shakespeare). Nothing new, at least, because even all the impressive data about the individual periodontal parameters are worthless for two main reasons: first, there is no information about the time points at which the data were recorded in "different hospitals". Would it not make a difference if the SBI was registered within the first month of therapy for the aligner group,

and in the second year of treatment for the conventional bracket cohort? And second, no measurement error assessment is reported, which is a no-go in any present-day scientific research.

Furthermore, the discussion is more a repetition of the results in words than anything else. The references are partially misleading which forced this reviewer to go to the original articles and read them to come to this conclusion; very time-consuming. But the longer this list of deficiencies gets, the more bored the readers of the Journal of Aligner Orthodontics will become. Worse still – they might ask why this commentator summarised this publication anyway? In his defence, he argues that he tried to expand the scope of journals from which he extracts the articles he reviews; this one comes from the Journal of Orthodontic Science, the official publication of the Saudi Orthodontic Society. Also, this reviewer is lucky enough to have repeatedly visited different places (including universities) in Saudi Arabia and been impressed by the level of knowledge of his local colleagues, a large number of whom received specialist training overseas.

The fact is, the text was initially declined by the review panel and thus revised for 3 months – certainly not long/thoroughly enough. Were the reviewers already tired during the second attempt or preoccupied by other projects?

This commentary began with a reference to Shakespeare and so it should end with a quote from "The Merchant of Venice". As good as the journal derivation of this article is, as inspiring its title may be (though not quite correct since aligners are not "other types of brackets"), as impressive as its enormous quantity of data is and as superb as its illustrations are, this critic's decision remains: "All that glisters is not gold."