Clinical

Aesthetics in arch form

Andrew Wakefield describes an alignment, bleaching and edge-bonding approach that produced a well-balanced outcome within four months

Dr Andrew Wakefield Retired general dental practitioner



Case overview

A female in her mid-20s attended an appointment at Apolline Dental, wishing to make improvements to her upper dentition (Figure 1).

She had undergone non-extraction fixed orthodontic treatment as a teenager and there had been relapse in both upper and lower arches.

Several ortho-restorative options were discussed, including fixed, removable clear aligners and removable IAS Inman Aligners.

The patient chose to proceed with orthodontic alignment with the Inman Aligner. The treatment plan would also involve intrusion of the UR1 using several IAS Clearsmile Aligners, followed by whitening and composite edge-bonding to complete the aesthetic effect.

The patient's UR2 also needed to be proclined and the UR1 retroclined.



Figure 1: The patient wished to make improvements to her upper dentition





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Figures 2 and 3: She had a class I incisor relationship, an overjet of 2mm, an overbite of 40% and overlapping incisors



Figures 4 and 5: The patient had a class I canine relationship on the right and left



Figure 6: She was inclined to bite her tongue bar and the habit had caused palatal movement of the UR2





Figures 7 and 8: The scan data shows the planned tooth movement following orthodontic treatment

Patient examination and case history

The extraoral examination revealed the patient had a mild skeletal class II malocclusion, an average Frankfort-mandibular plane angle (FMPA), average lower face height, no facial asymmetry and normal soft tissues.

The intraoral examination revealed a class I incisor relationship, an overjet of 2mm, an overbite of 40% and overlapping incisors (Figures 2 and 3).

The centrelines deviated to the lower right by 1mm, but there was no displacement on closure.

The patient had a one quarter class II molar relationship on the right and left, and a class I canine relationship on the right and left (Figures 4 and 5).

There was a unilateral right buccal crossbite with no displacement and a poor but asymptomatic posterior occlusion.

She had a posterior crossbite on the right from teeth 5 to 8, and anterior crowding on a mild skeletal class II base.

The difference between the available and required space was 0.5mm, as determined by the IAS Spacewize software.

The patient wore a tongue bar, which she was inclined to bite. This habit had caused palatal movement of the UR2.

The shape of the ball had worn into the distoincisal angle of UR2 and mesial surface of the UR3.

The resultant wedging effect had led to slippage of the distal contact of the UR1 with the UR2.

Consequently, the UR1 had become slightly over erupted, resulting in a discrepancy in the gingival level of the upper central incisors (Figure 6).

Treatment planning and objectives

This treatment would present several challenges.

The UR2 needed to be brought sufficiently labial to clear the mesial surface of the LR3.

Overeruption of UR1 had led to the uneven gingival level. And the incisal edge wear on the UL1 also needed correcting.

The ideal treatment plan would be to provide fixed braces to align the incisors to class I, intrude the UR1, correct the gingival levels and the buccal crossbite, and improve the posterior occlusion to class I.

The alternative option would be a slight compromise to the ideal treatment plan. This would align the upper incisors only, attempt to intrude the UR1 as much as possible, carry out composite edge-bonding to level the teeth and prevent further movement with a bonded retainer.

The patient opted for the alternative treatment, as she was only concerned with the anterior teeth and the posterior occlusion was not presenting issues for her.

She would therefore be provided with an upper Inman Aligner to align the incisors. This treatment would be reasonably short at around three months, and the removable appliance would produce a good aesthetic result.

Upper clear aligners would intrude the UR1 by 0.5mm to correct the slight overeruption and achieve a symmetrical appearance by rectifying the gingival margin discrepancy.

Alignment would be followed by teeth whitening, composite edge-bonding and the fitting of a bonded retainer for permanent retention.

Accurate impressions

At the initial appointment, an upper full-mouth impression was taken using Kulzer Flexitime Dynamix Monophase in the tray, with Kulzer Flexitime Light Flow extruded over the teeth.

The impression material was mixed in a Kulzer Dynamix speed system. The Dynamix machine ensures a clean, smooth, even and effortless mix, and is popular with the practice's nurses.

The lower-arch impression was taken using Kulzer Xantasil, which is a silicone-based alternative to alginate.

These impression silicones are highly accurate and stable and I have never had a problem with badly fitting appliances when I use them.

I like the handling of Flexitime due to its

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Figure 9: At the 13-week appointment, all tooth movements had been completed and the force drivers were removed



Figure 10: At the 18-week appointment, the bonded wire retainer was fitted



Figure 11: Composite edge-bonding had restored the original shapes to the subtly lightened teeth

flexible working time; I never feel pressure to rush to place the material in the mouth, and yet it sets quickly once the tray is seated.

Both impressions were sent to the IAS laboratory with a Spacewize assessment indicating the required 0.5mm space.

Figures 7 and 8 show the planned tooth movement following orthodontic treatment.

Teeth alignment and whitening

At the fitting appointment, interproximal reduction (IPR) and progressive proximal reduction (PPR) were carried out in accordance with the IAS instructions.

A composite anchor was attached to the palato-

incisal edge of UR2 and the upper Inman Aligner was placed.

The patient was shown how to remove and insert the appliance and was provided with cleaning instructions. She was advised to wear the aligner permanently except for mealtimes.

Although the patient was initially a little nervous about the prospect of IPR, the experience turned out to be a positive one for her.

Following the second week of treatment, the labial movement of UR2 was progressing well. Further IPR and PPR were performed.

By the fourth week, progress had been excellent. All the required IPR was completed, and the palatal bar was now in contact with the palatal surfaces of the UL1 and UL2, and the UR2.

It was anticipated that future progress might be a little slower. However, there was sufficient space to allow movement.

The labial bar was activated after six weeks.

A labial anchor was placed distally on UR1, halfway down the labial surface.

By the eighth week, the teeth were showing signs of good alignment.

A further Flexitime impression was taken for a set of upper clear aligners to fractionally intrude the UR1. The patient continued to wear the Inman Aligner in the meantime.

At the 10th week, fitting took place of the first of three clear aligners after using a stent to place an anchor on the labial surface of UR1.

All tooth movements had been completed and the force drivers were removed after 13 weeks (Figure 9).

The final clear aligner was used as a retainer. Impressions were taken for the bleaching trays and the initial tooth shade of A2 to A3 was recorded.

The following day, the patient commenced her two-week teeth whitening regime for two hours daily, using Philips Zoom! 6% hydrogen peroxide with ACP and custom-made, close-fitting trays.

Superior composite strength

At the 16-week stage, the whitening had been completed and shade B1 achieved.

Removal of aprismatic enamel took place, followed by etching to prepare the enamel surfaces and bonding with Kulzer I-Bond Total Etch.

Using the UR1 as a reference point, edge-bonding of the UL1, 2 and 3 and UR2 and 3 was carried out with Kulzer Venus Pearl B1 shade.

I love Venus Pearl for its superior aesthetics and its ability to blend with the opalescence of the natural tooth. It exhibits excellent handling characteristics and its superior strength is critical for those vulnerable incisal edges.

At this stage, a further impression was taken with Xantasil for an upper bonded wire retainer to be made by the IAS laboratory.

The edge-bonded composite restorations were finished with ultrafine diamond burs and polished with Sof-lex discs and rubber points with diamond polishing paste.

After 18 weeks, the bonded wire retainer was fitted (Figure 10).

Aprismatic enamel was removed, followed by etching and application of I-Bond Total Etch adhesive.

Kulzer Venus Diamond Flow was used to bond the wire retainer. Venus Diamond Flow has ideal handling properties for bonding retainer wires to teeth. The material is sufficiently thick not to slump

on placement, yet flowable enough to ensure smooth edges that require no polishing or adjustment. A new tray was made for top-up whitening as required.

Arch form goal achieved within four months

The patient was delighted with the result and has voluntarily decided to remove her tongue bar so it cannot do further damage.

A nice arch form was achieved within the estimated three-to-four-month treatment period.

Targeted, accurately performed IPR resulted in an aesthetically well-balanced appearance.

The UR1 was intruded sufficiently to even up the gingival margins on the central incisors. Composite edge-bonding had restored the original shapes to the subtly lightened teeth (Figure 11). Canine guidance in lateral excursion was enhanced by the addition of a little composite to the inciso-palatal surfaces of the canines.

The result is likely to be stable, thanks to the bonded retainer and the abandonment of the tongue bar by the patient. ${\bm D}$

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