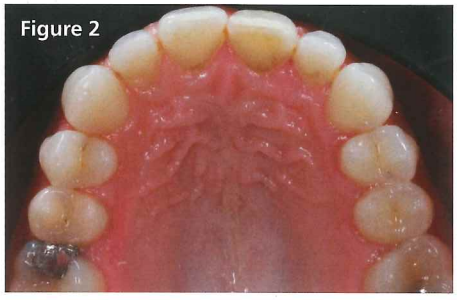
Two appliances for optimum results

Richard Field presents an effective minimally invasive smile makover case using two orthodontic appliances



Figures 1-3: The patient presented with mild lower anterior crowding as well as mild rotation of her upper left central incisor

For patients with minor to moderate anterior crowding or protrusion, IAS Academy offers a number of appliances that provide a minimally invasive treatment pathway alongside ethical, effective and safe delivery.

In this case, two separate appliances were chosen, using the Academy's universal technologies for both, including the Spacewize crowding calculator, Archwize 3D treatment planning, 3D printed models and space creation guides.

ENHANCED CPD

TOPICS

Cosmetic dentistry
Digital dentistry
Minimally invasive dentistry
Orthodontics
Tooth whitening

LEVEL

Intermediate

Educational aims and objectives

The purpose of this case study is to demonstrate the aesthetic results that can be achieved using a minimally invasive treatment pathway alongside ethical, effective and safe delivery.

Clear expected outcomes

Correctly answering the questions on page 58, worth one hour of verifiable CPD, will demonstrate that the reader understands the minimally invasive concept of align, bleach and bond.

Case presentation

A 29-year-old female patient presented to the practice looking to improve the aesthetics of her smile before leaving the country to go travelling for one year. Medically, she was fit and well and her general oral health was satisfactory.

The patient's main aesthetic concern was the lower crowding as well as the diminutive upper laterals. The patient's UL1 was darker in colour compared to surrounding teeth, most likely as a result of sclerosis from previous trauma. Further tests revealed that the UL1 remained vital with no signs of apical pathology.

From an orthodontic perspective, there was mild lower anterior crowding as well as mild rotation of her upper left central incisor (Figures 1-3; Table 1).

Richard Field graduated with honours from the University of Glasgow in 2011 and currently works in private practice between Bristol and central London. Richard has a particular interest in dental photography and minimally invasive cosmetic dentistry, especially composite bonding, anterior alignment orthodontics with the Clearsmile Inman Aligner and resin infiltration techniques for the removal of white spots. www.drfield.co.uk.

Treatment planning

The option of comprehensive fixed orthodontics was discussed with the patient in addition to a number of other possible treatment pathways, highlighting the benefits and disadvantages of each appliance. In the end, she opted for a Slim Bow Clearsmile Inman Aligner for the lower arch – which is visually invisible from the front on – and Clearsmile aligners for the upper arch to slightly rotate the UL1.

Home whitening was also discussed for both arches, with UL1 to have whitening on labial and buccal surfaces of the tooth and finally composite bonding bring the laterals into a more ideal proportion.

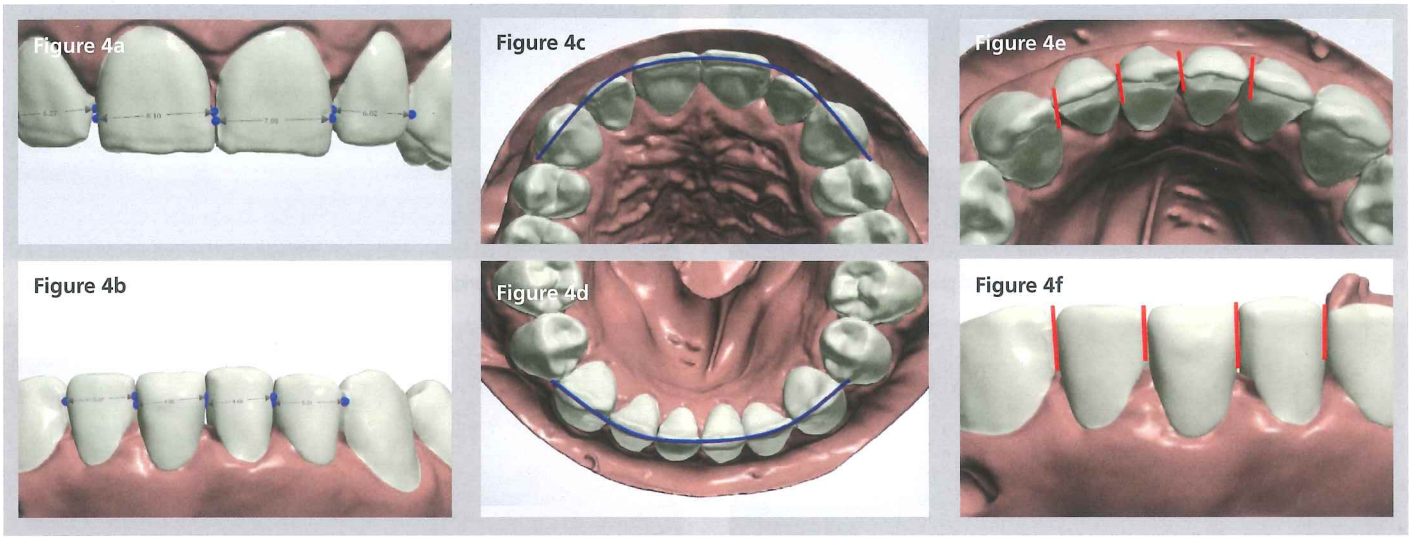
As part of the diagnostics, photographs were taken and the Spacewize digital tool used to analyse the arch form (Leifert et al, 2009). The Spacewize tool is used to confirm the patient's suitability for Clearsmile Inman Aligner treatment and predicts the approximate amount of interproximal reduction (IPR) needed. The curve is set so that the teeth are moved to the most functional, stable and aesthetic position with the use of landmark pointing.

Skeletal	1
FMPA	Average
Lower face height	WNL
Facial asymmetry	WNL
Soft tissues	WNL
Overjet	Nil
Overbite	3mm
Displacement on closure	nil
Incisor relationship	1
Canine relationship	1
Molar relationship	1
Teeth present	7-7
	7-7
Centrelines	Coincident

Table 1: Patient notes

The Spacewize trace also acts as an occlusal plan, so the digital setup made by the lab follows exactly the planned prescription from the trace provided.

Both digital and physical 3D printed models were made and discussed with the patient.



Figures 4a-4f: Digital and 3D-printed models show the patient the possible outcome and the physical contact with the models, which helps the patient to feel connected to the treatment plan. Predictive proximal reduction was performedon this case in the sites (Figures 4e and 4f)

Figure 5: The upper Clearsmile aligners were changed every two weeks as well as reviewing the lower aligner

Figure 6: To speed up the whitening of the darker UL1, this tooth was whitened both labially and palatally. A further week of whitening did not solve the aesthetic issue

Products used in this case

Clearsmile Inman Aligner *(IAS Academy)*
Spacewize crowding calculator *(IAS Academy)*
Archwize 3D treatment planning *(IAS Academy)*
Enlighten Evolution night *(Enlighten Smiles)*

Aesthetic TOOL KIT

This is an important step of consent as it shows the patient the actual possible outcome and the physical contact with the models, which helps the patient to feel connected to the treatment plan (Evans and Desai, 2016) (Figures 4a-4f).

The digital setup predicted three aligners with no IPR needed on the upper arch and 0.6mm needed for the lower arch.

Treatment pathway

Initial appointment

- Slim Bow Clearsmile Inman Aligner fitted in lower arch
- Composite anchors placed labially on LR1 and palatally on LL1
- First Clearsmile aligner fitted in upper arch
- Patient instructed to wear both appliances for approximately 20 hours a day.

Second appointment

- Clearsmile Inman Aligner intact
- Second aligner fitted.

Third appointment

- Clearsmile Inman Aligner intact
- Third aligner fitted.

Fourth appointment

- Alignment in both upper and lower arch complete
- Impressions for whitening trays and wax-up.

Fifth appointment

- Whitening trays provided and instructions given
- Wax-up review.

Sixth appointment

- Direct composite bonding
- Fixed retainer in upper and lower arch bonded for retention
- Impressions for final Essix retainer.

Once fitted, the upper Clearsmile aligners were changed every two weeks as well as reviewing the lower Clearsmile Inman Aligner (Figure 5).

The total time for alignment was six weeks. Once satisfied with tooth position, several sets of impressions were taken.

The first was for a wax up of the upper arch to be used as a guide for composite bonding as well as whitening trays, and the second for upper and lower Essix retainers to be fitted the following day to prevent relapse during home tooth whitening. The whitening process was carried out at night (Enlighten Evolution night 10% and 16% carbamide peroxide) with the patent wearing her Essix retainers during the day.

To speed up the whitening of the darker UL1, this tooth was whitened both labially and palatally. At the three-week whitening review it became apparent that the patient experienced a complication with the whitening of UL1, as the tooth had not whitened as predicted and unfortunately became more opaque than the neighbouring teeth.

A further week of whitening was carried out, but this did not solve the aesthetic issue (Figure 6). Two options were discussed with the patient:

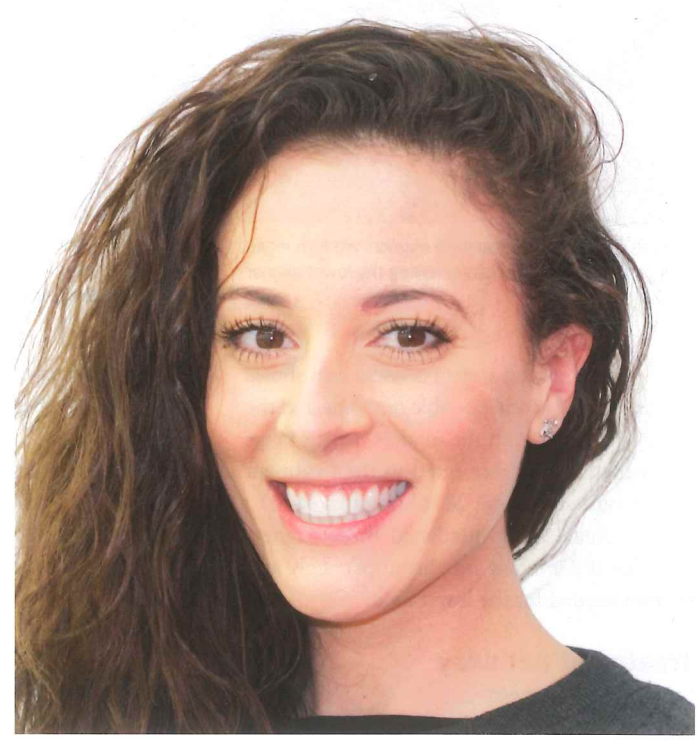
1. Make all the teeth more opaque in appearance to match UL1 using an opaque composite resin
2. Directly restore the tooth with a minimal facial preparation to allow for layering with more translucent composite.

With the patient's consent, the UL1 was given a minimal facial preparation prior to restoring the UL3 to UR3 with direct bonding using the wax-up as a guide (Figures 7-9).

Figures 7 and 8: The UL1 was given a minimal facial preparation prior to restoring the UL3 to UR3 with direct bonding using the wax-up as a guide

Figure 9: The UL1 was given a minimal facial preparation prior to restoring the UL3 to UR3 with direct bonding using the wax-up as a guide

Figure 10: The concept of align, bleach and bond (ABB), as pioneered by IAS Academy, is redefining the way many dentists approach cosmetic/aesthetic and functional dentistry altogether



Figures 11-13: The concept of align, bleach and bond as pioneered by IAS Academy, is redefining the way many dentists approach cosmetic/aesthetic and functional dentistry altogether

Conclusion

Simple anterior alignment orthodontics can offer very simple and efficient treatments to patients who might otherwise have chosen more invasive procedures.

Using digital planning via IAS Academy's Spacewize > Archwize > 3D printing pathway, the patient can be consented at every stage and full control can be kept of the anterior occlusion even when using different appliances, as they are ultimately built on a coordinated 3D setup.

With a combination of bleaching and some bonding, dramatic results can be achieved with very low risk and this kind of treatment can be afforded by many more patients.

The concept of align, bleach and bond (ABB), as pioneered by IAS Academy, is redefining the way many dentists approach cosmetic/aesthetic and functional dentistry altogether (Qureshi, 2011) (Figures 10-13).

Care to comment? @AesDenToday

References

Evans JW, Desai PS (2016) Applications for three-dimensional printing in dentistry. *Decisions in Dentistry.* 2(7): 28-32

Leifert MF, Leifert MM, Efstratiadis SS, Cangialosi TJ (2009) Comparison of space analysis evaluations with digital models and plaster dental casts. *Am J Orthodont Dentofac Orthoped* 136(1): 16e1-16e4

Qureshi T (2011) Minimally invasive cosmetic dentistry: alignment, bleaching and bonding (ABB). *Dent Update* 38(9): 586-588; 590-592