

Beauty and strength with composite resin artistry

Andrew Chandrapal presents a case in which he treated a patient suffering from severe lower anterior crowding with orthodontics and durable composite resin to produce a highly aesthetic outcome

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The use of composite resin in the anterior dentition is widely documented as a common treatment of choice. In situations where teeth have become misshapen due to trauma, tooth wear or malalignment, placing shade-matched and minimally invasive materials has continued to grow in popularity within the dental profession.

The clinician is, at times, faced with difficult choices when attempting to stabilise the occlusal aspects that have led to the initial complaint. The following case illustrates how such challenges were overcome, with a combination of basic orthodontics and a durable composite material yielding highly aesthetic results.

A female in her mid-50s attended Bourne End Dental because she was unhappy with the appearance of the lower anterior teeth. She also had concerns that the upper teeth appeared dark and uneven (Figures 1 and 2). Given she was in the public eye, she felt strongly that the lower teeth appear more 'uniform' and adopt a more attractive shade. Wearing a visible orthodontic appliance was not an appropriate option, neither was anything that would impede her speech. These considerations instantly limited the scope of treatment and led me to evaluate the patient's psychological profile to ensure she was suitable for ethical treatment with realistic outcomes.

Clinical examination and patient lifestyle

Upon examination it was revealed the patient exhibited poor-to-moderate oral hygiene and generalised chronic gingivitis. A class II skeletal relationship was recorded with deep overbite and high levels of anterior frictional wear (Figure 3).

High occlusal loading was also observed. She had severe lower anterior crowding and localised tooth surface loss (Figure 4). The patient also had heavily restored dentition. She was considered at low risk of periodontal complications and there were no signs of active caries.

The patient had a high-pressure career that led to long working days, erratic dietary habits and little time for rigorous oral health maintenance. She was encouraged to devote more time to preventive pre- and postoperative care, and asked if she would be willing to consider wearing a fixed brace or clear aligner with composite attachments.

It was explained that the final stage of treatment could not be completed until the gum tissues were at optimal health

It was confirmed that the patient was happy to attend appointments with a dental hygienist every three months and regular visits during the treatment programme. The patient was also consulted about minimally invasive techniques and whether she would accept a slightly compromised result with visually discreet procedures. It was explained that the final stage of treatment could not be completed until the gum tissues were at optimal health.



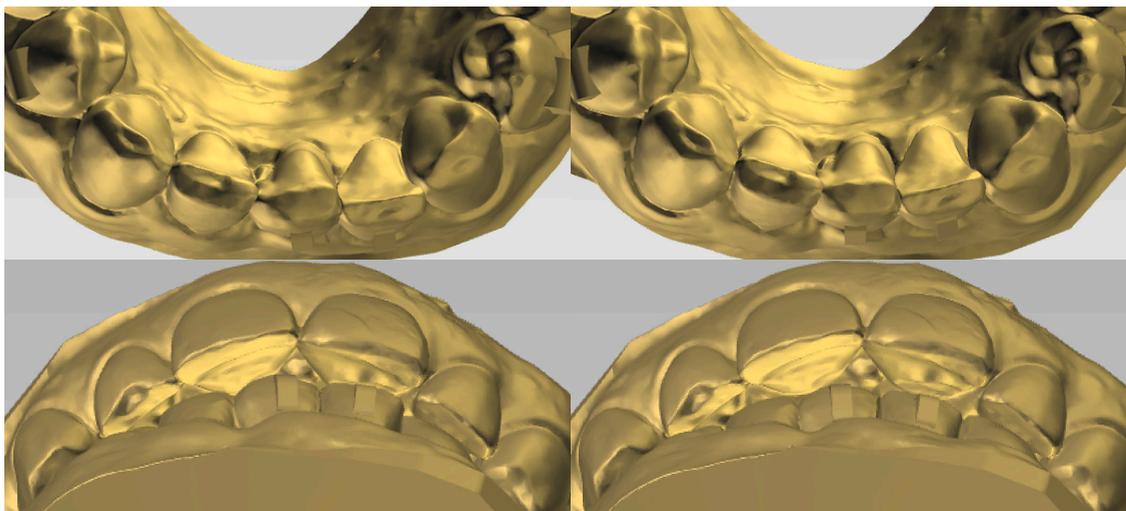
Figures 1 and 2: The patient was unhappy with the appearance of the lower anterior teeth and concerned that the upper teeth appeared dark and uneven



Figure 3: A class II skeletal relationship was recorded with deep overbite and high levels of anterior frictional wear



Figure 4: The patient had severe lower anterior crowding and localised tooth surface loss



Figures 5-8: The rendered images from the scan data showed the position of the lower incisors once LR1 had been extracted, and the perceived endpoint of orthodontic intervention



Figures 9 and 10: The composite button technique was used to select the correct shade of composite resin



Treatment planning

The agreed treatment plan included oral hygiene instruction and three one-hour hygiene and preventive care appointments.

Photographs and digital scans were taken. An occlusal analysis was carried out to ensure the aim of stable and bilateral contacts on the posterior teeth, and reduced anterior frictional contacts, could be achieved.

The patient had previously been treated at another practice with ceramic onlays on all the posterior teeth, and did not wish to have these altered. This meant space creation using extraction became a more justifiable option. The orthodontic recommendation was based on minimising anterior friction, elective extraction of tooth LR1 as it was the most protrusive, and retraction of the remaining lower incisors to eliminate the constricted envelope of function.



Figure 11: The Venus composite material offered the combined advantage of opacity and strength



Figure 12: A lasting lustre and homogenous surface were created with the upper definitive bonding; lower transitional bonding was also applied



Figure 13: The patient was very pleased with the aesthetic result, although aware the lower bonding was not yet definitive



Figures 14 and 15: The patient knew any improvement in soft tissue health was her responsibility, following which definitive lower anterior bonding would be completed

The plan also included transitional bonding to the mesial aspects of LR2 and LL1 to close the resultant diastema. Further soft tissue assessment and transitional bonding reduction would need to be carried out as the anterior teeth were retracted. This would be followed by a course of teeth whitening and concluded with upper anterior form corrections with definitive composite bonding.

Once the lower anterior teeth were sufficiently retracted, the transitional bonding would be converted to definitive composite bonding. The patient would then be periodically reviewed for ongoing maintenance.

Transitional bonding

The lower right front incisor was extracted atraumatically, avoiding removal of bone. Transitional bonding was immediately applied, as the patient became very aware of the resultant diastema created by the extraction. It was stressed that the bonding was temporary and would be modified and eventually replaced as treatment and alignment were concluded. Rubber dam was applied to isolate the extraction site and the Garrison Varistrip matrix system was used.

The rendered images from the scan data showed the position of the lower incisors once LR1 had been extracted, and the perceived endpoint of orthodontic intervention (Figures 5-8). The orthodontics proposal from Intelligent Alignment Systems (IAS) was invaluable in determining the disengagement of the anterior teeth

The use of a durable, opaque composite system can provide high-quality lustre and also achieve shade integration to mask tissue discolouration

upon mandibular elevation, and resolving the constricted envelope of function that had been instrumental in causing the incisal tooth surface loss.

Teeth alignment

The patient was advised to follow a strict oral hygiene regime. Composite attachments were placed and the patient was fitted with clear IAS aligners for a 12-week course. She was instructed to wear the aligners permanently apart from when eating and during cleaning. The patient was seen at fortnightly intervals to check the attachments and tooth movement, and to carry out interproximal reduction on the transitional bonding, ensuring the enamel on the lower anterior incisors remained as intact as possible.

At the final aligner stage, an intraoral scan was taken to produce Essix retainers which would fit, following removal of the composite attachments. These would be used for short-term orthodontic retention and as close-fitting and non-scalloped whitening trays. The patient was given Philips Zoom! Nitewhite 10% carbamide peroxide whitening formula contained in sealed, non-scalloped reservoir trays. She was shown how to apply the gel for a period of two weeks, and supplied with written instructions.

A two-week interval followed for the post-whitening shade to be determined, and to ensure the presence of whitening gel did not have a detrimental effect on the bond strength of the tooth to the composite material.

While the constricted envelope of function had been stabilised and the alignment complete, the lower soft tissues were still not deemed to be in a suitable state of health for carrying out the definitive bonding. It was agreed that the definitive lower arch diastema closure would be delayed until soft tissue health was optimal. Meanwhile, the upper arch bonding was carried out.

Anterior form corrections

The composite resin chosen for the case was Kulzer Venus Pearl. Figures 9 and 10 illustrate how the correct shade was selected using the composite button technique. This was carried out immediately following soft tissue retraction, to avoid dehydration of tooth

matter. Dehydration leads to incorrect shade selection and can mask internal features. It is therefore essential to apply the method within three minutes of tooth exposure in adults and 90 seconds for children.

The upper arch was isolated with a heavy gauge latex-free rubber dam (Unodent) and ligated using Wedjets interproximal bands. Venus Pearl incisal shade Amber (AM), Opaque Medium Chromatic (OMC) dentine shade and A1 universal shade were applied with a layered, freehand technique to ensure the correct blend and shade match. Kulzer Venus Color Corn and Blue tints were added to accentuate incisal edge features that were considered to be age appropriate, achieving the correct chroma, mixed with incisal translucency.

Given the small form corrections being carried out, a silicone stent was not used in this case. A Garrison Varistrip was sufficient for palatal support as well as interproximal contours.

On removal of the existing ULI composite restoration, it was noted that the tooth was slightly darker when compared to the contralateral incisor. A thicker, final layer of enamel composite with higher value was placed. This was noted to be one of the accepted compromises of the case. The Venus composite material offered the combined advantage of opacity and strength, ensuring darker tooth substrate could be sufficiently blocked without excessive preparation (Figure 11).

The upper arch composite restorations were placed using LM-Arte instruments and finished and polished with Sof-Lex discs and the Kulzer Venus Supra polishing system, to create a lasting lustre and homogenous surface (Figure 12). Due to the risk of weakening the physical properties of the composite system, no surface treatment of the unfilled or sculpting resins was carried out. Following review, the patient was fitted with a new Essix upper retainer and a bonded IAS retainer from lower canine to canine. To date, retention compliance has been excellent and issue free.

High-quality lustre and shade integration

The patient was very pleased with the aesthetic result (Figure 13). Initial concerns over her expectations, outcome and compliance were dispelled as she progressed through treatment. The only caveat was the definitive bonding to the lower diastema once the soft tissues had completely resolved.

The transitional bonding appeared slightly lower in value and higher in chroma when compared to the whitened natural teeth. However, the patient was satisfied with this and, most importantly, knew any improvement in soft tissue health was her responsibility (Figures 14 and 15).

The outcome, although not entirely concluded, appears to be positive. However, the case underlined the importance of effective communication and setting of clinical expectations from the outset. It also highlighted the need to ensure all outcomes are weighed up and agreed before treatment commences. Minimally invasive treatment is not always possible and patient choice is key. The use of a durable, opaque composite system can provide high-quality lustre and also achieve shade integration to mask tissue discolouration.

The clinician, hygienist and patient have a shared responsibility to improve and maintain high levels of oral hygiene. The clinician also has a duty to exercise integrity and to speak out if treatment needs to be repeated, delayed or modified in response to clinical presentation at that time. In all aspects of aesthetic improvement, it is far more than clinical techniques that produce a successful result.

Encouraging the patient to take ownership and establishing expectations are also critical, along with choice of appropriate materials, maintenance and review. The outcome, as with this patient, acts as a visual endpoint with the dentist as its greatest critic, but this is perhaps how it should always be. **D**

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