

# Natural upper anterior transformation

**Vishaal Shah** describes how he uses the biologically oriented preparation technique and direct composite restoration to repair a patient's damaged central incisors

**A** 45-year-old male presented at Dentality @ Hoddesdon because he was unhappy with the appearance of his upper central incisors.

His main concern was his UR1 crown (Figure 1), which had a receding gum line and poor aesthetics. The patient's UL1 was chipped with a fracture extending down the buccal midline of the tooth (Figure 2). He also wanted whiter and straighter teeth but was reluctant to invest in orthodontic treatment.

## PATIENT ASSESSMENT

Extraoral and intraoral examinations were carried out. It was established that despite having had dental work completed in the past, the patient was unaware of the current state of his dentition.

In addition to the leaking UR1 crown with gingival recession and the chipped and fractured UL1, he suffered from several failing restorations with underlying caries.

There was evidence of mesial caries under the restorations on UL6 and LL7 and poor occlusal anatomy on all the existing restorations.

The patient's upper left and lower left sextants had suffered heavy wear and there was evidence of bruxism and clenching in the posterior sextants. Lower arch crowding was recorded.

The gentleman had an over-erupted LL2 and UL6 and his LL6 was missing. He had a buccally tipped UL2 and the LL3 was mesially tipped and buccally crowded out.

## TREATMENT OPTIONS

The treatment options discussed included replacement of the failing restorations and space maintenance in the lower left quadrant to replace the missing LL6.

The patient also required alignment and levelling of his dentition to relieve crowding and to improve his overall occlusion. Retention was recommended, using a combination of fixed and removable retainers and a Michigan splint to protect any dentistry provided and to treat his parafunctional habits.

Despite discussion of the ideal treatment plan, the patient opted for a new zirconia crown for the UR1 and a composite resin restoration to repair the UL1 because it was more cost effective. He also chose to have his teeth whitened. All other treatment was declined.

It was explained in detail that due to the unfavourable occlusion, the longevity of the restorations requested could be compromised if he did not take a comprehensive approach to his treatment. However, the patient was reluctant to make the financial commitment but stated that he would

return to have the outstanding work completed at a later stage.

The ramifications of doing nothing were explained in detail. These would include further over-eruption of the UL6 into the lower left edentulous space and the crowding becoming worse as the LL2 would continue to over erupt, wear and further contribute to the collapse of the intercanine width.

The imbalance in posterior occlusion would mean potentially more occlusal forces on the remaining teeth or unilateral function, resulting in more wear and tear on the right side. The consequences of over-eruption of the UL6 into the lower left edentulous space and overall additional wear on the teeth were also highlighted to the patient.

## TOOTH WHITENING AND CROWN PREP

Prior to the restorative appointment, the patient's teeth were whitened. Boutique Whitening gel with 10% carbamide peroxide was used during week one and 16% carbamide peroxide during weeks two and three.

After bleaching, the restoration was delayed for one week to allow the shade to 'settle' and to enable optimum conditions to bond composite resin to the UL1. The pre-treatment shade was A2 and the final shade was B1 after whitening had been completed.

At the next appointment, the UR1 was prepared for a new temporary crown. A



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**FIGURE 1:** The patient wanted improved aesthetics for his UR1 crown



**FIGURE 2:** The UL1 was chipped with a fracture extending down the midline of the tooth



**FIGURE 3:** The depth of the gingival sulcus was assessed



**FIGURE 4:** The underlying tooth core was examined



**FIGURE 5:** The tooth was prepared using the biologically oriented preparation technique (BOPT)



**FIGURE 6:** A stump shade was taken



**FIGURE 7:** The temporary crown was marked to indicate the ideal level for the cervical portion of the crown



**FIGURE 8:** The gingival profile was drawn onto the temporary crown and the crown adjusted accordingly



**FIGURE 9:** The final primary anatomical features and shapes were pencilled onto the temporary crown

preoperative impression was taken using super soft putty. Local anaesthetic was administered, and the depth of the gingival sulcus assessed (Figure 3). The old crown was removed, and the underlying tooth core examined (Figure 4). The angle of the core was checked in three dimensions within the line of the arch.

**BOPT TECHNIQUE**

The UR1 was prepared using the biologically oriented preparation technique (BOPT) (Figure 5). The treatment stages and intended outcome of the BOPT technique were fully explained to the patient.

Retraction cord soaked in astringent was applied into the gingival sulcus to stem the bleeding and to retract the gingival tissues. A stump shade was then taken (Figure 6) that would later be communicated with the laboratory. A bis-acryl resin material was extruded into the preoperative impression and

applied to the patient's teeth. Once the bis-acryl had set, the impression was removed and the excess material discarded. The temporary crown was then tried back in the mouth to ensure that the fit and occlusion were correct.

The tooth was marked to indicate the ideal level for the cervical portion of the crown (Figure 7). The gingival profile was drawn onto the temporary crown and the crown adjusted accordingly (Figure 8). The final primary anatomical features and shapes were pencilled onto the crown (Figure 9) and created using a range of composite finishing burs and Kulzer Venus Supra pre and high gloss finishers.

It is important to spend time to achieve the correct profile and line angles, as this will enable the clinician to get an indication of how the end result will look. It is also important to ensure that the 'gingival portion' of the temporary crown is well polished. The retraction cord was then removed and approximately 1.5mm was left

between the cervical margin of the crown and the gingival tissues to allow them to migrate coronally into the space.

**CORONAL MIGRATION**

The temporary crown was in place for four weeks (Figure 10). The fact that this was a well-fabricated and aesthetically pleasing temporary crown made the length of time and the additional visits required to complete the restoration more acceptable to the patient.

Achieving improved shape, emergence and line angles for the temporary crown is exceptionally important. The patient then returned for review and once again the health and movement of the soft tissues were assessed.

If there is little or no coronal migration of the gingival margin, as was the situation in this case initially, the distance required for the migration can be reduced by adding more composite to the gingival aspect of the temporary crown and



**FIGURE 10:** The temporary crown, placed immediately postop, was left in situ for four weeks

then incrementally reducing the base of the temporary crown as the gingival tissues migrate coronally. Alternatively, the temporary crown can be removed and bleeding induced into the sulcus followed by allowing a blood clot to form, which enables healing of the soft tissues into the space, or both methods can be used.

From experience, I find that the distance for coronal migration should be between 0.5mm and 1mm. The temporary crown needs to be trimmed incrementally to help 'guide' migration of the

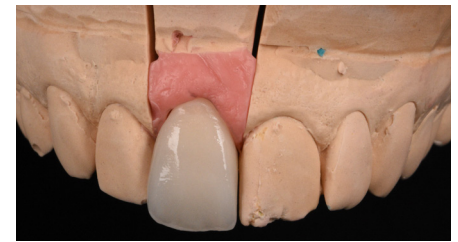


**FIGURE 11:** The temporary crown was removed and shade B1 was recorded

gingival tissues.

In this case, as the patient was travelling a lot for work, attending appointments was difficult. Therefore, I decided to make the space approximately 2mm and test how this would work. Unfortunately, this approach didn't quite go to plan, so when taking the final impression, I 'irritated the tissues' with a finishing bur to induce bleeding and create a clot.

I instructed the patient to be very careful when brushing the area in order to allow the tissues to regenerate and migrate coronally.



**FIGURE 12:** The laboratory fabricated the final crown

#### FINAL IMPRESSION AND CROWN FABRICATION

The temporary crown had allowed for approximately 1mm of coronal migration after one month, which is when the final impression was taken.

The temporary crown was removed under local anaesthetic and the overall basic shade B1 was recorded (Figure 11). The stump shade was rechecked to ensure that it was the same as when initially taken.

Further photographs under different lights were taken, including a cross polarised filter to

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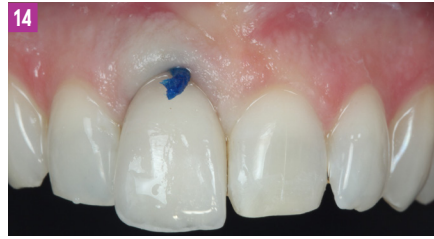
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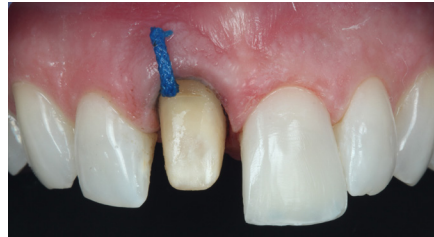




**FIGURES 13 and 14:** A retraction cord was placed into the gingival sulcus and the UL1 prepared for composite restoration



**FIGURE 16:** Venus Diamond shade Clear (CL) was placed onto the stent and Opaque Medium Chromatic (OMC) masked the transition line



**FIGURE 17:** Venus Diamond B1 shade was used to build up the dentine layer of the tooth and proximal walls. A 0.5mm thick layer of Clear (CL) was placed over the surface



**FIGURE 19:** The crown was cemented into place with temporary cement and the retraction cord removed

give the lab as much information as possible to enable them to fabricate the crown.

To achieve an accurate and detailed impression, the double retraction cord technique was used with size 000 soaked in astringent and placed in the depth of the sulcus to create haemostasis, followed by a size one cord to retract the gingival tissues.

The temporary crown was placed back onto the tooth and the patient was asked to bite down on it for approximately five minutes. The temporary crown and superficial retraction cord were removed and an impression was taken using a super soft putty and wash.

The impressions were sent to the lab and the technician was asked to take photographs of the models once cast.

At this point, the laboratory was instructed as to where the margin of the final crown should sit.

The lab fabricated the final crown based on the photos, impressions and lab prescription (Figure 12). In this case, I requested that the UR1 crown be made and then the model digitally

scanned. Once scanned, a Geller model was made with a digital wax-up to reinstate the anatomy of the UL1 based on the shape of the new crown to be fitted on the UR1.

The patient returned two weeks later to have the final crown fitted and the UL1 was prepared for composite restoration, prior to seating the final crown. The progress of the gingival migration in relation to the temporary crown was assessed again. It was then removed. The smile line with the final crown in place was checked to be correct and accepted by the patient.

A retraction cord was placed into the gingival sulcus and the prepared tooth 'cleaned' under local anaesthetic with a sandblaster and rotary polishing bur.

The crown was placed over the tooth and ease of seating and marginal fit was assessed (Figures 13 and 14).

The occlusion was checked. The patient confirmed he was happy and was asked to bite down for five minutes on a cotton wool roll to push the crown into its fully seated position.



**FIGURE 15:** The putty stent was placed and the position of the crown verified



**FIGURE 18:** The pencil markings were gently smoothed out to create surface anatomy

### COMPOSITE BUILD-UP

Prior to cementing the UR1 crown, a putty matrix was made using Kulzer Provil Novo. Provil Novo serves as a stable base for precise and accurate impression of a model that can be used as a stent. As the putty is green, it provides a good contrast to be able to assess thickness of the palatal shell when the clear composite is placed onto it. The putty stent was placed and the position of the crown verified (Figure 15). The palatal aspect of the UL1 was marked against the stent with a probe.

Kulzer Venus Diamond nano-hybrid composite was chosen to restore the UL1. I find that Venus Diamond has superior polishability and was the perfect material to blend with the teeth due to its chameleon-like characteristics and easy handling. The composite also offers a high filler content and exceptional mechanical performance and durability.

Venus Diamond incisal shade Clear (CL) was placed onto the stent and extended just past the line engraved with a probe showing the palatal extremity of the prepared tooth and cured for 20 seconds. The stent was then removed very gently and the thickness of the composite palatal shell was assessed. Venus Diamond shade Opaque Medium Chromatic (OMC) was then used to mask the transition line (Figure 16).

Venus Diamond B1 shade was placed to build up the dentine layer of the tooth and proximal walls. Once the dentine layer was built up, a 0.5mm thick layer of Clear (CL) was placed over the surface (Figure 17).

The final effect was created with Kulzer Venus Color white and blue shades to incorporate

the incisal halo. I find that these shades stand the test of time, ageing appropriately with the natural dentition.

### FUNCTIONAL AND AESTHETIC RESULT

The UR1 crown was removed and checked for any overhanging composite from the UL1. The margins were refined using a number 12 scalpel blade. The crown was placed back into the mouth and primary anatomy drawn onto the restoration with a pencil.

The pencil markings were gently smoothed out to create surface anatomy (Figure 18) using the Kulzer Venus Supra polishing kit with both red and grey polishing points.

All the polishers were used in different areas of the UL1 to enable me to refine and polish the restoration. The pre-polishers followed by the high gloss polishers were used to finish the restoration. A diamond polishing paste produced a final natural sheen. The Supra kit has just two grades of polishing points, so is time-saving and simple to use.

The crown was cemented into place with temporary cement and the retraction cord removed (Figure 19). This was carried out as I was still not entirely happy with the position of the gingival margin in the UR1 area.

The patient returned one week later so that the gingival tissues could be reassessed and the composite restoration repolished (Figure 20). Postoperative photographs were taken and will be reviewed at subsequent appointments to assess how the restoration is coping in function.

The final crown with temporary cement was left in place for a further 10 weeks during which the patient was reviewed twice.

During these review appointments, I 'irritated' the soft tissues in an attempt to induce further coronal migration. At this point I felt that I had managed to achieve as much coronal migration as possible and the patient was also happy with the result.

During the same visit, we decided to cement the crown definitively with resin modified glass ionomer luting cement.

A successful durable and aesthetic outcome was achieved. Initially, this gentleman was a little apprehensive because of the limitations of the materials to be used, in terms of longevity and overall aesthetics. He also found it hard to believe coronal migration of the gingival tissues would be possible, which worried him when the temporary crown was initially placed. However, by the end of treatment, he was over the moon.

This case highlighted the importance of ensuring that the patient is comprehensively informed about the plan, the options and risks prior to treatment. Taking photos builds a library of cases that can be used to show other patients what they could expect from treatment. [📷](#)

### PRODUCTS USED

**Boutique Whitening** Boutique Whitening  
**Venus Supra, Venus Diamond, Provil Novo** Kulzer

