

**DR VISHAAL SHAH**

BDS PGCE

Vishaal is the principal dental surgeon and clinical director at Denticity @ Hoddesdon in Hertfordshire. He is a Fellow of the Academy of Dentistry International and the Pierre Fauchard Academy of Dental Honours. Since qualifying in 2003, Vishaal has undergone extensive training in cosmetic dentistry and composite bonding techniques.

ENHANCED CPD

GDC anticipated outcome: C

CPD hours: one

Topic: Composite restorations

Educational aims and objectives:

To present a case study that utilises composite resin to replace failing and anatomically incorrect posterior restorations, resulting in an aesthetic and durable outcome. This article qualifies for one hour of enhanced CPD; answer the questions on page 88.



Composite resin is one of the most durable and predictable restorative materials used in dentistry to restore posterior teeth (Da Rosa Rodolpho et al, 2022).

The following case summary highlights the importance of trust and belief in our materials as dentists.

To replace a failing UR6 mesial occlusal restoration and an anatomically incorrect UR5 distal occlusal restoration, I chose to work with a composite that I knew would have excellent durability and strength yet would meet the highest demands of both function and, less important in this case, aesthetics.

CASE STUDY

A 40-year-old female patient presented at Denticity @ Hoddesdon. She was complaining of food packing between the UR5 and UR6 and sensitivity in the UR6 area where a filling had been placed a few months previously (Figure 1).

She had since made repeated visits to her GDP who advised her to allow time for the tooth to settle and assured her that this was common.

Despite numerous appointments over the following 12 weeks, the patient experienced no relief from her symptoms and claimed that they had, in fact, worsened.

PATIENT ASSESSMENT AND DIAGNOSIS

Extraoral and intraoral examinations and an assessment of the temporomandibular joint were carried out with no obvious anomalies.

A clinical and radiographic assessment established that the UR5 had a large distal occlusal composite restoration, which was not in keeping



FIGURE 1: The patient was complaining of food packing and sensitivity between the UR5 and UR6



FIGURE 2: The UR5 had a large distal occlusal composite restoration that was overextended

with the anatomy of the tooth due to its wide emergence profile (Figure 2).

The UR6 had an older occlusal composite filling and a mesial occlusal restoration that had been placed more recently by her GDP (Figure 3). The UR6 was also showing signs of occlusal wear with enamel pitting noted on both the crests of the mesial buccal and mesial palatal cusps.

Vishaal Shah describes how he used composite resin to replace failing and anatomically incorrect posterior restorations, resulting in an aesthetic and durable outcome

Creating anatomy for restored comfort and function





FIGURE 3: The UR6 had an existing occlusal composite filling and a recently placed mesial occlusal restoration



FIGURE 4: Removal of the old restorations revealed caries at the base of the UR6 mesial box and axial wall caries was also noted



FIGURE 5: Care was taken to ensure that the entire cavity margin was clear of any carious dentine by at least 1mm



FIGURE 6: Once preparation was complete and all caries removed, the UR5 and UR6 were sandblasted with 27 micron aluminium oxide powder



FIGURE 7: The mesial wall of the UR6 was built up using Venus Diamond Universal shade A3

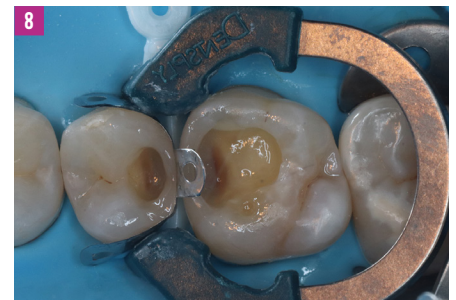


FIGURE 8: Build-up of the UR5 distal wall to the correct anatomical profile

Both restorations were anatomically incorrect, as they were not in harmony with the anatomy of the patient's natural teeth and had been left completely flat occlusally. The UR5 had been overextended distally, leading to food packing.

The patient was medically fit and well with no ailments or allergies and was not taking any regular medication. She had good oral hygiene with pink and healthy gingival tissues.

Sensitivity was reported between the UR5 and the UR6 when cold air was blown into the interproximal area. The pain eased and did not linger after removal of the cold stimulus.

The patient suffered with dentine hypersensitivity with reversible pulpitis associated with potential leakage of the recent UR6 mesial occlusal restoration.

It was also possible that the restoration on the UR5 may have partially debonded due to the occlusal forces in the area and from the wear exhibited on the mesial cusps of the UR6.

Unsure of the previous protocols for bonding, it was decided that the most appropriate treatment option would be to remove and replace the mesial occlusal filling on the UR6 and the distal occlusal restoration on the UR5.

In doing so, it would be important to ensure that robust bonding protocols were followed to seal the dentine and that the anatomical features of both teeth were appropriately restored.

The patient opted for composite resin to restore both teeth.

CARIES REMOVAL AND PREPARATION

Local anaesthetic was administered to the patient by buccal infiltration and rubber dam was placed. Removal of the old restorations revealed caries at the base of the UR6 mesial box, and axial wall caries was also noted (Figure 4).

The presence of caries and the lack of adequate bonding of the restoration to the affected dentine was likely to have been the reason for the sensitivity.

Care was taken to ensure that the entire cavity margin was clear of any carious dentine by at least 1mm from the amelodentinal junction (Figure 5). Once preparation was complete and all caries removed, the UR5 and UR6 were sandblasted with 27 micron aluminium oxide powder (Figure 6).

The teeth were etched with 37% phosphoric acid gel for 20 seconds. Primer and bonding agent were applied and light-cured in accordance with the manufacturer's instructions.

Due to the deep mesial margin on the UR6, it was ensured the rubber dam was inverted to prevent any gingival crevicular fluid rising from underneath the dam and contaminating the site. Without this in place, the bond between the tooth and restoration could inadvertently be

compromised, potentially leading to a recurrence of the original symptoms.

IMPRESSIVE WEAR RESISTANCE

The composite selected for the posterior restorations was Kulzer Venus Diamond. I find that the material is easy to work with and due to its high filler to resin ratio gives the restorations strength and durability.

These qualities are particularly beneficial in a case like this where there is an obvious parafunctional habit that has led to the wear facets on the mesial cusps of the UR6.

I have used Venus Diamond for more than six years and I have been able to photographically document the longevity of the restorations. The wear resistance of the composite is impressive, and restorations remain intact at the margins after years in function.

The next steps were to build up the proximal walls in order to obtain the right emergence profile of the teeth, to ensure that the contact points were adequate and the teeth were restored to their correct anatomical dimensions.

My 'go-to' matrix system is the Palodent V3 system, which has several features that complement my work. These include rigid metal matrices that are easy to put in place.

There are five sizes to ensure that the interproximal surfaces can be built up to the



FIGURE 9: A good interproximal embrasure shape was achieved, with an anatomically correct contact point sufficiently wide to prevent food from packing in the area



FIGURE 10: Following restoration of the interproximal surfaces, the cusps of each tooth were built up individually



FIGURE 11: The un-restored portions of the teeth were used to mimic the depth and position of the fissure patterns



FIGURE 12: The final effect was created with a touch of colour using Kulzer Venus Color in choco and white shades



FIGURE 13: A final light-cure was carried out through glycerine gel to prevent the oxygen inhibition layer



FIGURE 14: The rubber dam was removed

ideal height and are anatomically correct in shape, mimicking the profile of a tooth from the base of the cavity to the marginal ridge.

The rigid matrices ensure flush contact against the surface of the tooth. The clamps also have enough space within the system to be able to manipulate the matrix into the desired shape of the planned restoration. The system is easy to remove once the interproximal portion of the restoration has been built up.

The entire quadrant was isolated with rubber dam and the occlusal scheme was checked. A wide wedge was placed to secure the matrix in position.

A Palodent V3 retaining ring was placed to ensure the matrix was flush with the external cavity walls extending buccally and palatally. The matrices were then adjusted to create an emergence profile consistent with the shape of the tooth.

Prior to placing the composite, it was confirmed that the matrix was not encroaching on the space needed for the restoration on the adjacent tooth.

COMPOSITE BUILD-UP

The mesial wall of the UR6 was built up using Venus Diamond Universal shade A3 (Figure 7). The composite was thoroughly packed by

condensing the material with a burnisher to ensure that no voids were left, followed by a probe to remove any excess material.

The material was then smoothed with a microbrush to create the marginal ridge.

The occlusal plane was checked again to ensure it was in keeping with the composite placed. This minimises the need to adjust the occlusion after removal of the rubber dam.

The original tooth shape was mimicked as far as possible to ensure that the composite wall resulted in a harmonious match with the rest of the tooth structure. This portion of the restoration was light-cured for 20 seconds in accordance with the manufacturer's instructions.

The matrix was then removed and the mesial wall inspected for any voids. A size 12 scalpel blade was used to remove any excess composite including overhangs.

The same procedure was repeated to build up the distal wall of the UR5 (Figure 8).

Finally, a good interproximal embrasure shape was achieved, with an anatomically correct contact point sufficiently wide to prevent food from packing in the area (Figure 9).

It is important to understand that this is probably the most critical part of the restoration and time and care must be taken to get it right. If the interproximal profile is incorrect then the

restoration will more than likely be flawed in its emergence and anatomy.

Following the restoration of the interproximal surfaces, the cusps of each tooth were built up individually (Figure 10).

It is key to remember that the cusps need to be in the correct positions in relation to the central fissure line of the tooth being restored which should, in turn, be consistent with the central fissure pattern of the occlusal plane. This is why isolation of the entire quadrant is of paramount importance.

I referred to the un-restored portions of the teeth to mimic the depth and position of the fissure patterns (Figure 11).

FINISHING TOUCHES

The final effect was created with a touch of colour using Kulzer Venus Color in choco and white shades (Figure 12).

Although the restoration will gradually develop a natural stain, I find that these shades stand the test of time, ageing appropriately with the natural dentition.

Conventionally, these type of restorations are layered, where a dentine shade is placed, followed by stain and finished with an enamel shade over the top. In the posterior quadrants, I personally find this method to be time



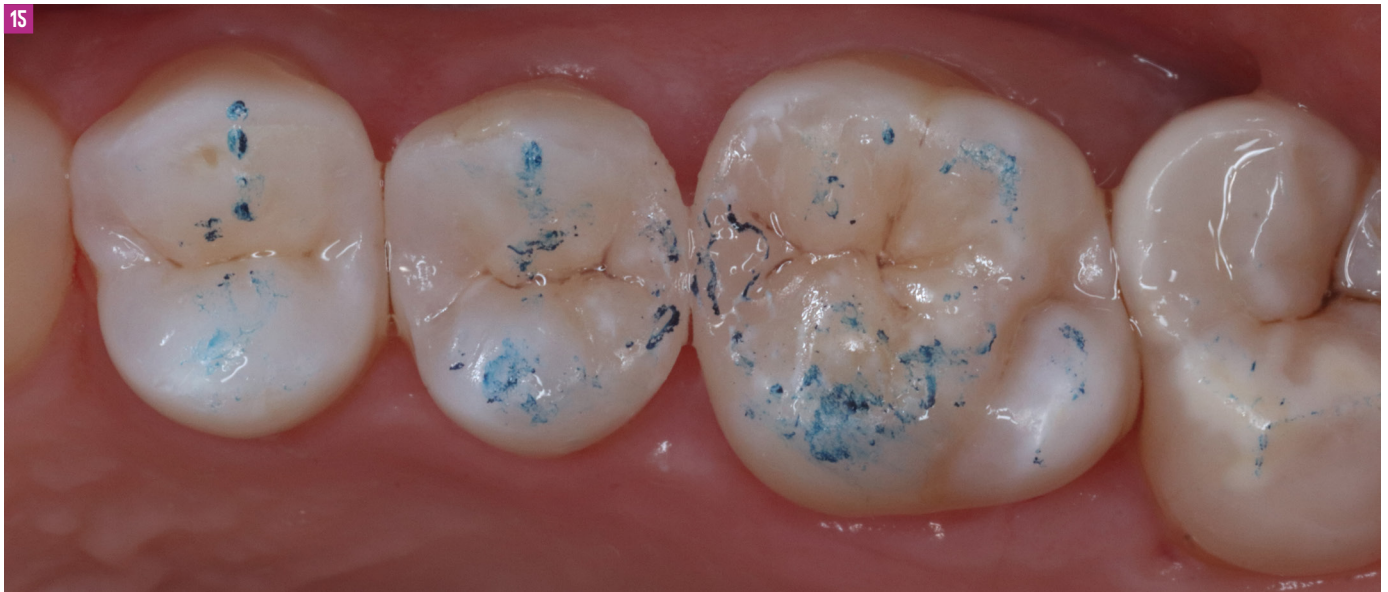


FIGURE 15: The occlusion was checked in maximum intercuspation position as well as in protrusive and excursive movements

It is important that adjustments are made incrementally to ensure that contacts are not fully removed and the anatomy of the restoration is maintained

consuming and often needing more occlusal adjustment at the end of the procedure. Using a single dentine shade, in my experience, has proved to be sufficient and saves time.

A final light-cure was carried out through glycerine gel to prevent the oxygen inhibition layer (Figure 13). The restorations were carefully examined for any irregularities or excess composite and the rubber dam was then removed (Figure 14).

The occlusion was checked in maximum intercuspation position as well as in protrusive and excursive movements (Figure 15). Minimal adjustments were made using ultra-fine composite finishing burs. The occlusion was checked again and further reduction carried out.

It is important that adjustments are made incrementally to ensure that contacts are not fully

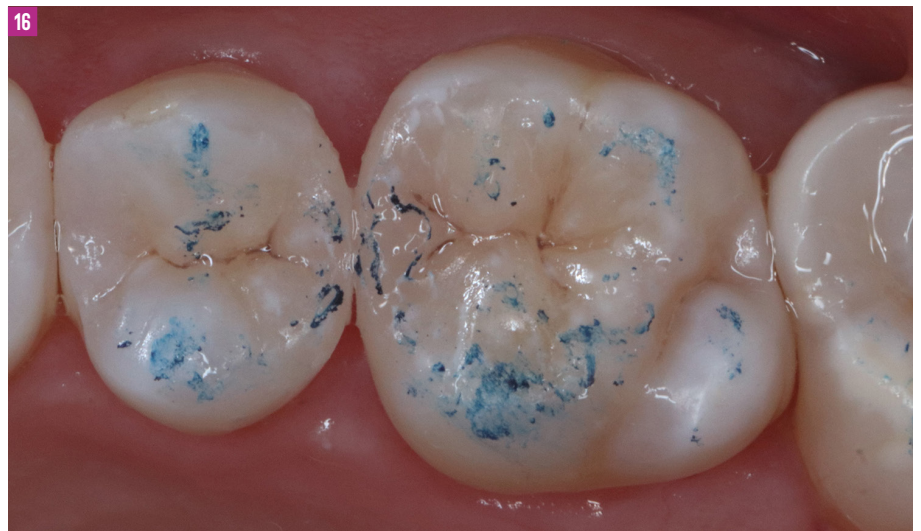


FIGURE 16: The patient was delighted with the natural-looking restoration and no longer experiences any symptoms or sensitivity

removed and the anatomy of the restoration is maintained.

An aesthetic, functional and durable outcome was achieved. Creating the shapes of both teeth was difficult initially and the main challenge was the build-up of the proximal walls. The patient was delighted with how the restorations adapted to the surrounding dentition and she no longer experiences any symptoms or sensitivity (Figure 16). [CD](#)

CONTACT

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REFERENCE

Da Rosa Rodolpho PA, Rodolfo B, Collares K, Correa MB, Demarco FF, Opdam NJM, Cenci MS, Moraes RR (2022) Clinical performance of posterior resin composite restorations after up to 33 years. *Dent Mater* 38(4): 680-688

PRODUCTS USED

Venus Diamond,
 Venus Color Kulzer
 Palodent V3 Dentsply Sirona