

# Advances in Posterior Composites



*Editorial Note: A list of references is available from the publisher: director@AADFA.net*

**F**or reasons of cost, patients and dentists today often find themselves obliged to use restorative materials for the treatment of large structural, functional and aesthetic defects. This case report demonstrates how an innovative, organically modified ceramic composite with extremely low shrinkage stress and volume contraction can be used to restore teeth while preserving tooth substance. Occlusal functionality is key to the longevity of the restoration.



**Fig 1:** Pre-operative situation showing large restorations and minimal residual tooth structure.

A 71-year-old female patient presented in my practice requiring replacement of insufficient, excessively large composite resin restorations of the lower right first and second molars (Fig 1). The natural crown still retained a small amount of residual structure, and the patient did not wish any further removal of tooth substance. For cost reasons, the patient also did not wish any prosthetic treatment, e.g. in the form of ceramic restorations. The patient was recommended a direct complex resin onlay requiring functional and non-functional cusp reduction. With this unconventional approach, it was important that the occlusal design should take into consideration the strengths and weaknesses of both the restorative material and the residual tooth structure.

The patient was given a local anaesthetic with one cartridge of 4 % articaine with 1:100,000 adrenaline, and the teeth were isolated with a rubber dam prior to removal of the existing restorations. In order to ensure a caries-free, hard dentine base, three successive checks were performed with a caries detector (Caries Marker, VOCO). The thickness of the remaining cusps was measured, and found to be 3 mm at the base. The margins were strongly bevelled to maximise the amount of the planned restorative material with minimal reduction in the cusp region, and thus achieve a large contact surface. No centric contacts or other extensive functional contacts were planned for the cavity areas being treated.



**Fig 2:** Completed preparation with strongly bevelled margins as an alternative to straight cuspal height reduction. The cusps were at least 3 mm thick at their base. The occlusal shaping must be very thorough to minimise the lateral excursion load on the cusps.

The preparations were micro air abraded using 27 micron aluminium oxide. Then a selective enamel etch technique using 33 % orthophosphoric acid was performed, followed by bonding with Futurabond U (VOCO). The lingual cusps of tooth 46 were created free-hand using the universal shade Admira Fusion x-tra,

a purely ceramic-based bulk-fill composite. The cusps were widened towards the centro-occlusal aspect progressively in 2 mm increments. The key factor here was not applying this bulk-fill material in bulk, and thereby ensuring maximum depth of cure at all times.

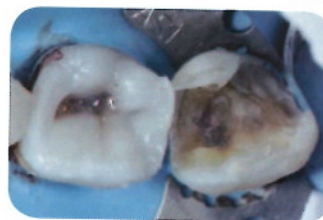


**Fig 3:** The teeth were micro air abraded using 27 micron aluminium oxide. A selective enamel etch technique was then applied using Futurabond U. The lingual cusps were built-up with a purely ceramic-based bulk fill ORMOCER (Admira Fusion x-tra, shade U, VOCO).

The benefit of Admira Fusion x-tra is the increased depth of cure, which is inherent to this restorative. After curing of the base of the lingual cusps, a sectional matrix system (V3, Triodent) was used. In the gingival floor area of the proximal box, a small quantity of the flowable Admira Fusion Flow (shade A3, VOCO) was used in three 0.25 mm increments (extremely thin) to ensure complete and maximum marginal hybridisation and adaptation. The marginal ridges were then incrementally completed using Admira Fusion x-tra (shade U).



**Fig 4:** The marginal ridges were built-up using a sectional matrix system (V3, Triodent, Dentsply Sirona). In this fashion, we have converted a complex Class II into a Class I situation.



**Fig 5:** The buccal lobes were built-up individually, starting with the mesiobuccal lobe.



**Fig 6:** After all buccal lobes were fully cured, FinalTouch brown shade (VOCO) was added to the base of the lobes as part of the Tam interlobe staining technique.



**Fig 7:** The mesiolingual cusp was shaped and finished with a brush to create the infoldings into the mesiolingual and mid-lingual lobes. The brown stain was partially covered, leaving it only slightly visible and thus giving a natural appearance.