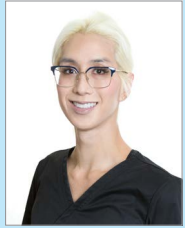




# Placement Of Complex Direct ORMOCER Posterior Composite Restorations: A Case Report

**Dr. Clarence P. Tam** is originally from Toronto, Canada, where she completed her Doctor of Dental Surgery and General Practice Residency at the University of Western Ontario and the University of Toronto, respectively. Clarence's practice is limited to Cosmetic and Restorative Dentistry. She is well-published to both the local and international dental press, writing articles, reviewing and developing prototype products and techniques in Clinical Dentistry. She frequently and continually lectures internationally. Clarence is the Chairperson and Director of the New Zealand Academy of Cosmetic Dentistry. She is currently one of two individuals in Australasia to hold Board-Certified Accredited Member Status with the American Academy of Cosmetic Dentistry. Clarence is an Opinion Leader for multinational dental companies Kuraray Noritake, J Morita Corp, Henry Schein NZ, Ivoclar Vivadent, DentsplySirona, 3M ESPE, Kerr, GC Australasia, SDI, Coltene, Triodent and is the only Voco Fellow in Australia and New Zealand. She holds Fellowship status with the International Academy for DentoFacial Esthetics. She is a passionate and approachable individual and is committed to having an interactive approach with patients in all of her cases to maximize predictability.



Dr. Clarence P. Tam

Economic times have forced patients and Dentists alike to utilize restorative materials once never designed for large-volume use in a modern manner to solve extensive structural, functional and esthetic deficits in a cost-effective manner. This case demonstrates the use of a novel, super-low polymerization shrinkage stress and volumetric contraction organically-modified ceramic composite to restore teeth in a residual structure-respectful way. Occlusal functional design is key for longevity.

This 71 year old female presented to my service for replacement of failed excessively-large composite resin restorations on teeth 46 and 47. There was minimal residual coronal structure and the patient wished not to have any further removal of tooth structure. It is well-known that bonded indirect porcelain restorations can successfully regain flexural strength in structure-compromised teeth but this approach was rejected due to financial constraints of this geriatric patient. When a direct complex resin onlay was suggested with requisite functional and non-functional cusp reductions, the patient was in favour of an angulated, heavy cavosurface bevel as opposed to actual vertical tooth height removal. If this controversial approach was taken, the occlusal design chosen would need to respect the strengths and weaknesses of not only the restorative material used but also of the residual tooth structure.



Fig. 1

The patient was anaesthetized with 1 carpule of 4% Articaine with 1:100,000 epinephrine and the teeth isolated with a rubber dam before removal of the existing restorations. Caries detector was used in 3 successive washes to ensure a caries-free, hard dentin base (**Caries Marker, Voco**). The base of the residual cusps were measured for thickness and confirmed to be 3mm at the base. The cavosurface margin was aggressively bevelled to maximize the planned bulk of restorative material over the cusps with minimal reduction. No centric contacts or functional excursive contact is planned for the cavosurface areas. The preparations were micro air abraded using 27 micron aluminium oxide before a selective etch technique using 33% orthophosphoric acid and bonding using Futurabond U (**Voco**). The lingual cusps of tooth 46 were created in a freehand manner using the Universal shaded **Admira Fusion X-tra U**, an all-ceramic bulk-fill composite resin. These cusps were widened towards the centro-occlusal aspect progressively in 2mm increments essentially not using a bulk-fill material as a bulk fill to ensure maximal depth of curing. The benefit of **Admira Fusion X-tra** is an increased depth of cure ensuring maximal monomer conversion when used in conventional restorative increments. Once the base of the lingual cusps were substantial, a sectional matrix system (**V3, Triodent**) was secured. A light liner of Admira Fusion flowable A3 was used on the gingival floor of the proximal box in three successive increments of 0.25mm each (extremely-thin) to ensure complete marginal hybridization and maximal adaptation and the marginal ridges incrementally completed using **Admira Fusion X-tra U**. The buccal lobes were layered individually using **Admira Fusion X-tra U** before the Tam interlobe staining technique was utilized (**Brown, Voco Final Touch**). The lingual cusps then were placed individually, thus finishing off the occlusal design. The 46 was finished completely before application of the matrix system to 47 (**Omnimatrix, Ultradent: distal marginal ridge**) (**V3, Triodent: mesial marginal ridge**). The 47 was layered in a similar manner, again using a single shaded bulk-fill material (**Admira Fusion X-tra U**).

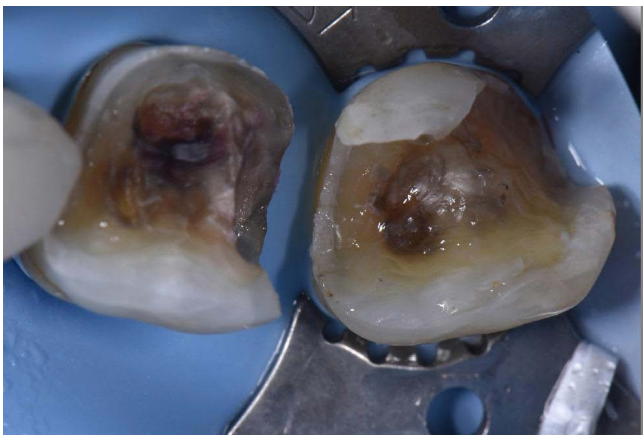


Fig. 2

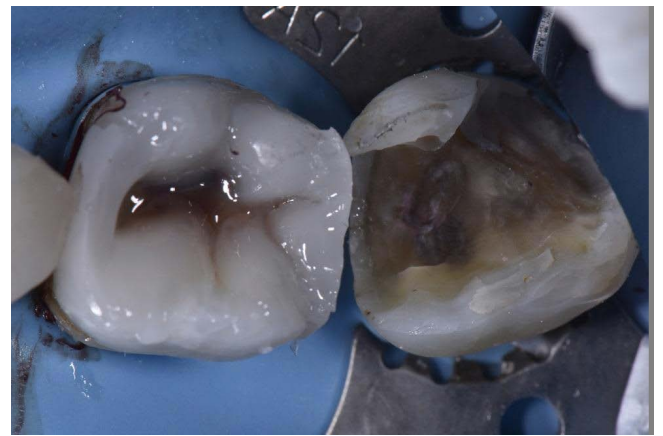


Fig. 6

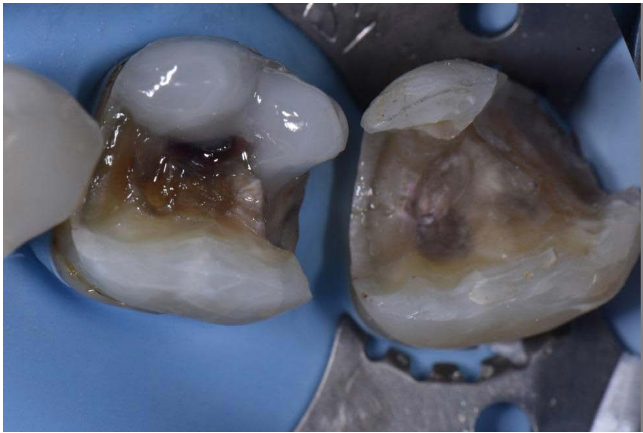


Fig. 3

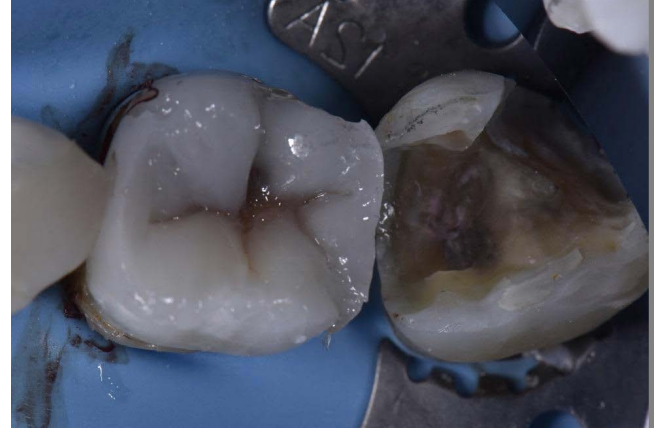


Fig. 7

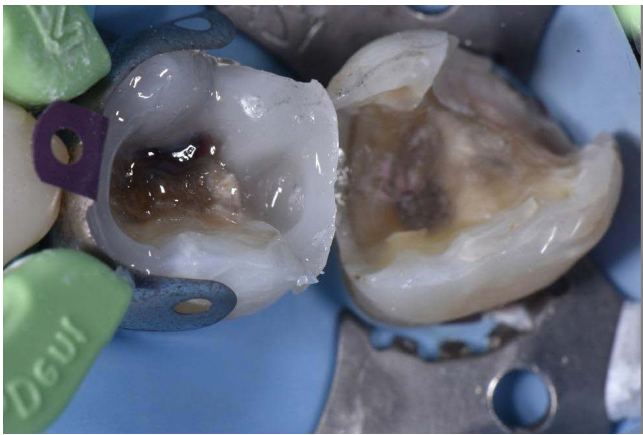


Fig. 4

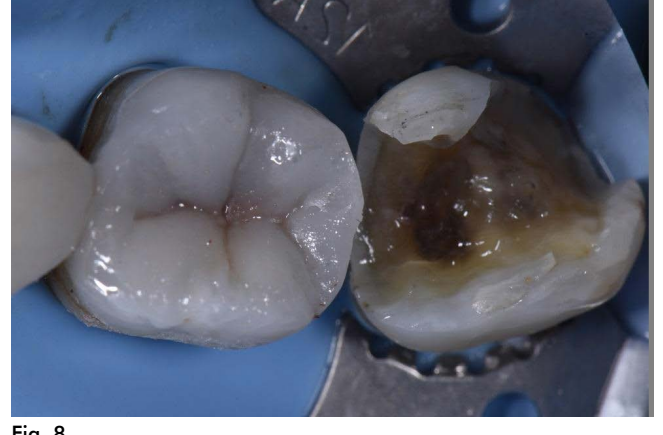


Fig. 8



Fig. 5



Fig. 9





Fig. 9



Fig. 10

A small amount of maverick tinting to reflect enamel hypocalcification was placed on the triangular ridges of the 46 and 47 using a white tint (**Final Touch, Voco**) and polymerized fully with an overlying glycerin layer to remove the oxygen inhibition layer. Occlusal adjustments were minimal. The occlusion was dialed in to establish light centric contacts with no lateral excursive contact or interferences, respecting the fact that composite is strong in compressive strength but weak in flexion. The restorations were finished under water spray with a single stage polisher (**Dimanto, Voco**) to high shine.

#### Rationale For Material Selection

Geriatric Dentistry is becoming a more prominent part of everyday general dental practice. The key concept for dental goals in this population essentially is "ability to function without heavy investment."

With a majority of older individuals not willing to invest heavily in their teeth, it is important to understand how modern direct and indirect restorative materials function under load and attempt to design the restoration to fit this model. Composite resin is strong in compression but weak in tension or flexion. Enamel has a compressive strength of 384MPa and dentin 297MPa. Conversely, the flexural strength of dentin is 165.6MPa. The compressive strength of **Admira Fusion X-tra U** sits at 307MPa and flexural strength at 132MPa, acceptable values when compared to nature. The real benefit from **Admira Fusion** is from the total lack of conventional methacrylate monomers in its composition, allowing for a more biocompatible restoration (essentially an all-ceramic composite compatible with all bis-GMA bonding systems) whilst minimizing volumetric shrinkage (1.25%) to the lowest level found on the market today without needing to change to silorane protocols. The ability to maintain an excellent marginal seal is critical in Class II restorations, especially in situations where the cavosurface margin is found in a sub-CEJ location on dentin. Arora et al investigated the role of flowable composites in the marginal integrity in sub-CEJ Class II cavosurface margins and found a significant reduction of microleakage when a flowable composite liner was used instead of pure packable composite resin<sup>(1)</sup>. The premise of this is that the first point of failure of Class II restorations is at the cavosurface of the proximal box floor especially when subgingivally-located and thus both low volumetric shrinkage and shrinkage stress are additional key components to high marginal precision and integrity. The extremely low shrinkage stress (3.71MPa) of this material in combination with curing depth efficiency ensures marginal integrity to a maximal degree, especially if used in small increments like a conventional composite. Biocompatibility in this region is important for minimal gingival irritation and an all-ceramic composite attracts less biofilm than resin composite.

Overall, the stunning chameleon effect of this material combined with ultimate handling properties makes it the go-to choice for over 90% of posterior restorations in my practice and when combined with the easily-applied tints in the Final Touch collection really elevates my efficiency, esthetics, marginal integrity and predictability, all in virtually one smart material. Another first from Voco.

#### References

1. Arora, R., Kapur, R., Sibal, N., and Juneja, S. Evaluation of Microleakage in Class II Cavities using Packable Composite Restorations with and without use of Liners. *Int J Clin Pediatr Dent.* 2012;5(3):178-184..