



Case report: All-ceramic 3-unit posterior bridge

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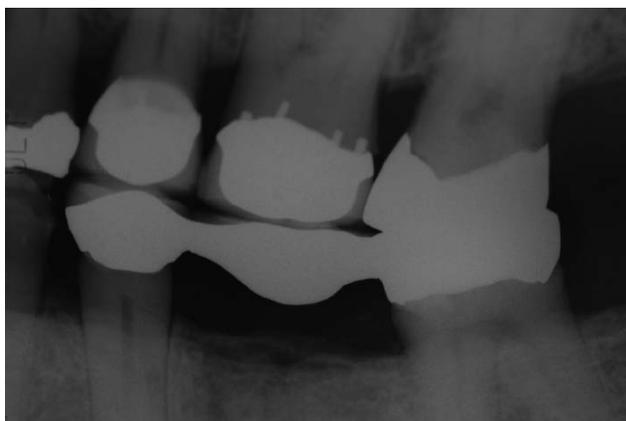


Figure 1.



Figure 2.



Figure 3.



Figure 4.

History and diagnosis

The patient was a 64-year-old male with a history of parafunction. The #36 was missing and had been replaced with a three-unit bridge from #37 to #35. The patient stated that the present bridge was his second and that both bridges had experienced loss of ceramic from the metal frame. As the clinical crowns of the relevant teeth were very short, it was deduced that the limited occlusal clearance had resulted in a thinned metal bridge frame being cast for the PFM restoration and that subsequent flexure of the bridge was leading to the delamination of the ceramic. After consultation with the patient, it was decided to replace the existing PFM bridge

with a new, zirconia all-ceramic bridge. The LAVA zirconia system (3M ESPE) was chosen as it was felt that there would be adequate thickness available for the frame of the bridge in the retainer and connector regions. Even with a thin frame, excellent aesthetics were expected from the metal-free system and as the bridge would be made from the high elastic modulus material zirconia, no clinical flexure was expected in the bridge, thus preserving the layering ceramic (Lava Ceram, 3M ESPE) and the overall form of the restoration.

Figure 1 is a bite-wing radiograph showing the 3-unit PFM bridge in place. Note the loss of layering ceramic from the pontic region.

Figure 2 shows the old PFM bridge has been removed, and the abutment teeth re-prepared for all-ceramic crowns. Note an emphasis is placed on rounding the axio-gingival and all other internal line angles.

A polyvinylsiloxane impression was made of the prepared teeth using Express Putty/Wash impression material (3M ESPE) (Figure 3).

Protemp (3M ESPE), a conventional Bis-GMA based provisional restorative material was used in a silicone putty matrix (Sil-Tech, Ivoclar, Lichtenstein) to make the interim provisional bridge. The bridge was luted to place using a provisional cement, Rely-X Temporary Luting (3M ESPE). Note that the connector areas were



Figure 5.



Figure 6.



Figure 7.



Figure 8.



Figure 9.



Figure 10.

widened to afford greater fracture resistance for the provisional bridge (Figure 4).

The shade for the bridge was then confirmed as a match for the Vita A4 tab (Figure 5).

Resin Rock (Whip-Mix, Kentucky USA) stone dies were made from the impression for the fabrication of the case. Multiple pours were made from the Express PVS impression so as to create master, working and uncut “check” dies (Figure 6).

The dies were scanned and the frame-

work designed digitally. The frame was then machined from a block of green partially stabilised zirconia and sinter fired. Lava Ceram was applied to the zirconia framework to build the case to full contour. Note the internal zirconia framework has been tinted to a more saturated hue from the original white shade (Figures 7 and 8).

Figure 9 shows the completed case returned from the laboratory, ready for inspection, try-in and insertion. Lava zirconia cases are guaranteed for 5 years against clinical failure.

The case was tried in and the interproximal contacts, internal fit and margins were assessed (Figure 10). The occlusion was then checked in MIP position and adjusted.

As zirconia is a polycrystalline ceramic material with no glass phase, it is not possible to acid etch it prior to cementation. Therefore, it is necessary to air-abrade it with alumina oxide abrasive particles to micro-roughen the internal surface (Figure 11). The self adhesive luting cement, RelyX Unicem (3M ESPE) may then be used to lute the bridge to place.



Figure 11.



Figure 12.

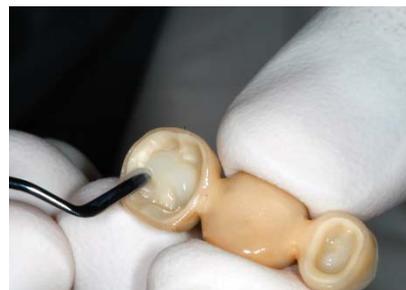


Figure 13.



Figure 14.



Figure 15.



Figure 16.



Figure 17.



Figure 18.



Figure 19.

This cement has been shown to chemically bond to the zirconia framework.

However, the adhesion can be augmented by the use of the CoJet system (3M ESPE). The CoJet powder consists of alumina oxide particles which have been specially coated with silica. When the particles are fired from a micro-etcher and strike the inner surface of the crown, they impact into the zirconia and leave the silica imbedded in the surface. The zirconia now has a silica layer on its inner bonding surface. A silane coupling agent can now be applied to this surface (Figure 12). The Silane will chemically bond to the silica, and the luting cement will chemically bond to the silane. The final bridge will thus be able to be adhesively cemented onto the abutment teeth.

Rely-X Unicem is applied to the fitting surfaces of the bridge and it is seated to place under pressure (Figures 13 and 14). Excess is cleaned up firstly with floss (inter-

proximally) and then a curette, as initial polymerisation occurs (Figures 15 and 16).

After cleanup, the final light activation of the cement is initiated (Figure 17).

Figures 18 and 19 show the completed bridge and the patient was placed on a 6-month review period.

Lava bridge was completed by Race Dental Laboratory - North Ryde, NSW.

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Dr Mandikos received his Bachelor of Dental Science Degree with honours from the University of Queensland. From 1995 to 1998 he studied at the State University of New York at Buffalo, (USA) where he graduated with a Certificate in

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