

# Minimally Invasive Porcelain Repair Using High-Strength, Wrapped Aesthetic Veneers



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One of the most frustrating situations dentists face is fractured porcelain on a patient's bridge, especially if it was recently made or is a well-fitting and functioning older prosthesis. The problem lies in our lack of ability to bond repair materials to porcelain with a good long-term result, and the obvious inability to bake or fire porcelain in the patient's mouth. The cause of fractures is typically trauma, either an acute accident or chronic habitual issues such as bruxing, but the end result is the same. Less common causes might be porosities or flaws in the original porcelain fabrication or inadequate thickness during tooth preparation. Composite coupled with silane for bonding to porcelain seems to provide an immediate repair, but the long-term stability is not dependable. As a result, we struggle with temporary solutions until we finally redo the entire bridge.

*Various forms of overlays or "taco shells" have been demonstrated in the past with composites and porcelains, but only time will tell which of these will yield the highest success.*

This article describes 2 cases that present minimally invasive repair methods for salvaging damaged porcelain in the mouth.

## CASE NO. 1

A 68-year-old male with a 2-year-old 6-by-11 bridge presented with fractured porcelain on the facial-incisal aspect of No. 10 (Figure 1). This was the result of a direct blow to the face from a metal gate kicked by an uncooperative young bull trying to escape loading into a pen about a month earlier. Fortunately, the fracture was confined within the facial embrasures of the pontic No. 10, and no other areas were damaged except for facial bruising and cuts. Upon radiographic examination, no root fractures were found, and margins of the bridge were intact. The patient was asymptomatic to percussion, temperature, and air, and he was only concerned about the appearance



Figure 1. Fractured porcelain bridge pontic No. 10.



Figure 2. Gingival view of PFM and temporary overlay.



Figure 3. Metal primer application to bridge final prep.



Figure 4. Final resin cementation of PFM overlay.



Figure 5. Fractured porcelain bridge pontic No. 7.



Figure 6. Final preparation of bridge pontic for porcelain overlay.

and roughness. His real fear was the effort and expense of making a new 6-unit bridge, as mentioned by the attending emergency dentist immediately post trauma.

## Procedure

The pontic area was prepared on the facial, incisal, and lingual surfaces to allow adequate

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clearance and draw for a PFM overlay. The transition from facial to lingual over the metal bridge framework at the mesial and distal margins gives the provisional and permanent overlays the appearance of a taco shell shape when viewed from the gingival aspect (Figure 2). After final impressions with Examix NDS heavy body/injection (GC America), a cold-cured acrylic provisional was cemented with Neo-Temp (Waterpik Technologies). The final restoration was fabricated by Carter Dental Lab using a solid working model and no individual dies. A cast, high noble metal

(Euro [Argen]) coping was veneered with Ceramco3 porcelain (DENTSPLY Ceramco). The PFM taco shell crown was seated over the remaining bridge framework and luted into place using LINKMAX (GC America) metal primer (Figure 3) and resin cement (Figure 4). The restoration has now been in place for 2 years without incident.

**CASE NO. 2**

A 66-year-old female presented with fractured mesial-incisal-facial porcelain on tooth No. 7 of a 6-by-8 bridge after eating a "soft" breakfast one morning (Figure 5). All radiographic and diagnostic tests for root fractures or pulpitis were negative. Within the last

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year she had relocated from another state, where she just had extensive restorative dentistry done to refurbish her "worn and discolored teeth." This included implant placement in 2 edentulous areas and crowns and bridges on implants and natural dentition. The patient had a history of

fractured teeth, fillings, and crowns, and had been told of bruxing. Her muscles of mastication were extremely developed, and her most recent dental work displayed signs of wear. It was evident she was a bruxer, and her recent personal events of relocation and family medical issues had likely contributed to increased bruxing activity and ultimately this breakage.

The options of completely remaking the 6-month-old 6-by-8 bridge, attempted repair with bonding materials, or porcelain overlay were discussed. A final decision of a porcelain overlay was agreed upon.

**Procedure**

The bridge was prepped similar to the previous case (Figure 6), and an acrylic temporary was fabricated and cemented after final impressions with Examix. After consulting with the laboratory (Carter Dental Lab), a Cercon coping with Ceram S porcelain veneered surface (DENTSPLY Ceramco) was fabricated (Figures 7a and 7b). Both the bridge and the porcelain were conditioned and cemented with GC Fuji PLUS cement kit (GC America; Figures 8a and 8b). Immediately, impressions and bite records were taken to fabricate a custom acrylic bruxing splint. This was delivered the same week, and the patient was instructed to wear it every night. The patient has had no further breakage of either porcelain or natural teeth since then.

**CONCLUSION**

Porcelain fracture is a common cause of failure that necessitates completely remaking otherwise good dental restorations. As in the examples above, various forms of overlays or "taco shells" have been demonstrated in the past with composites and porcelains, but only time will tell which of these will yield the highest success. This minimally invasive approach initially appears to be a conservative, yet stable option for handling at least some of the challenging situations we face in dentistry. ♦

Dr. Herwig is a Texas Dental Association delegate and an ADA alternate delegate. He is past general

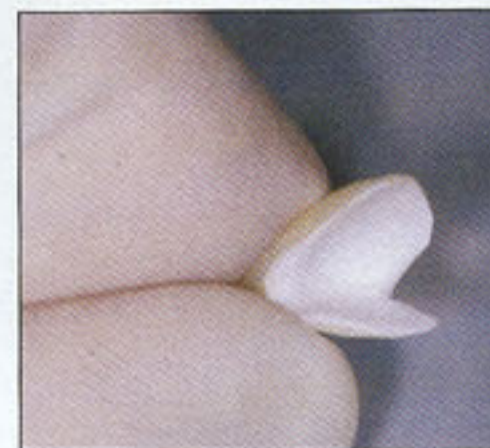


Figure 7a. Final Cercon overlay: gingival view.



Figure 7b. Final Cercon overlay: facial view.



Figure 8a. Cercon overlay cementation with GC Fuji PLUS.



Figure 8b. Final Cercon overlay repair of porcelain bridge pontic No. 7.

chairman (1997) of the Dallas MidWinter meeting (Southwest Dental Conference), past president of the Dallas County Dental Society (1999), and past Dallas AGD president (1994). He is a fellow of the American and International Colleges of Dentists, the Academy of Dentistry International, and the AGD. He is also a Baylor Dental College and LD Pankey alumni. Occasionally, he does research and speaking related to minimally invasive and conservative dentistry, and has presented in 6 countries. Currently, Dr. Herwig serves on a council for the ADA and as a trustee of the newly formed Texas Dental Association Smiles Foundation (a merger of the TDA and TDHS foundations). He can be reached at (214) 361-1845 or lherwig@sbcglobal.net.



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