COMMENTARY

UTILIZATION OF MULTIPLE RESTORATIVE MATERIALS IN FULL-MOUTH REHABILITATION: A CLINICAL REPORT

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Drs. Nam and Raigrodski and Mr. Heindl are to be congratulated for the beautiful restorative dentistry performed for the patient described in their case report. This is an example of complex, sophisticated, interdisciplinary dentistry that can only be accomplished at this level by paying meticulous attention to detail. The diagnostic workup for this patient was comprehensive, and the integration of the periodontal therapy and provisional phase of rehabilitation was impeccable. It is worthy to mention the 9-month waiting period after crown lengthening that was observed. Many dentists establish their final margin location and make impressions too quickly after periodontal surgical procedures and run the risk of recession of the gingival tissues, exposing restorative margins.

The authors discussed at length the fact that three different restorative materials were used in the definitive rehabilitation. Feldspathic porcelain veneers were used to restore the mandibular anterior teeth, and metal-ceramic crowns were used on the second molars, including a fixed partial prosthesis from tooth #2 to #4. These are correct and logical choices. The remaining restorations, including a fixed partial prosthesis replacing tooth #29, were fabricated using a zirconia-cored material (Lava, 3M ESPE, St. Paul, MN, USA).

It is not suggested that the use of a zirconia-based material is incorrect for these restorations, but in the opinion of this author, the authors are interpreting the literature available on zirconia-based restorations very optimistically, and a discussion related to that may be of value to the readers. The authors claim that Lava restorations were selected for its excellent esthetic potential, coupled with function and longevity as documented by clinical studies. Zirconia-cored restorations definitely possess excellent physical properties, including very good fracture toughness, and they possess the ability to undergo a process called transformation toughening, which can stop the propagation of Griffith's flaws and other defects. Transformation toughening involves a change from the tetragonal to the monoclinic form and places the propagating defect under compression, thereby preventing further propagation. This is an excellent property as long as only small areas of the core are affected. If large portions of the core undergo this process, the restorations can be substantially weakened.

Ceramic materials require clinical studies before they should be routinely used by clinicians. Scharer proposed that, before a ceramic system can be declared suitable for clinical use, the system should have independent clinical studies and have a success rate of 95% at 5 years.[1] While admittedly, these criteria are arbitrary, they seem logical, and there are few, if any, clinical trials that meet these criteria for posterior teeth (including molars) or fixed partial prostheses. In one of the studies cited by the authors, investigators placed 20 posterior fixed partial prostheses using Lava.[2] Bruxing patients were excluded from the study. At 31 months, five restorations had experienced chipping of the ceramic veneer.

In another study published in 2007, 57 posterior fixed partial dentures (FPDs) were placed.[3] At 5-year recall, 17 FPDs were lost to recall, which is a very high dropout rate and is cause for concern. Twelve of the remaining FPDs required replacement, primarily because of recurrent caries, yielding a survival rate of only 73%, which is a far cry from meeting Sharer's criteria. In addition, over 15% of the surviving FPDs had experienced chipping of the ceramic veneer. Only one zirconia framework fractured in this study, but the survival rate of the prostheses was quite poor.

A recently published article reviewed all of the published and ongoing clinical trials related to zirconia restorations and reported that all studies were experiencing a relatively high rate of chipping of the ceramic veneer, with rates ranging between 8 and 50% at 1 and 2 years.[4] Data on metal-ceramic fracture rates varies from 4 to 10% at 10

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years. Thus, at the time of writing, in spite of their exceptional physical properties, it is appropriate to consider zirconia-based restorations still as somewhat experimental.

Two other comments seem pertinent. Lava restorations were chosen in part because the patient wished to have metal-free restorations. The authors wisely convinced the patient to accept metal-ceramic crowns on restorations involving second molars. In situations where patients demand metal-free restorations, clinicians should be advised to modify their usual warranty to reflect realistic survival rates based on clinical trials.

The authors also stated that they chose Lava restorations because conventional cements can be used with it, and that this was a good thing because the patient's gingival health was less than perfect. It is not clear how these factors are related, and the zirconia restorations were cemented with a dual-cure self-adhesive resin cement (RelyX Unicem, 3M ESPE). In the opinion of this author, this is not a conventional dental cement. Self-adhesive resin cements are still considered experimental by some because of potential long-term hydrolysis of some of the hydrophilic components. Again, it is not suggested that this was an inappropriate cement to use. The comment is simply that RelyX Unicem is not a "conventional" cement.

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