Ask the Experts

CLINICAL PERFORMANCE OF LOW FUSING FRAMEWORK VENEERING CERAMIC MATERIALS

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QUESTION: I have been told that there are problems with the veneering porcelain fracturing from zirconia cores. Is this something that I should be concerned about?

ANSWER: As with most dental materials, the continued development of ceramic contributes to the improvement of patient care. At times, however, "new and improved" might not be improved in actuality. There is rising concern that the newer generation of lower temperature (750-810°C) porcelains used to veneer computerassisted design/computer-assisted milling-produced zirconium oxide framework systems are exhibiting lower cohesive strengths than the traditional higher temperature porcelains.

The rationale for development of these low-fusing porcelains is a

desire for a less opposing enamel wear than what occurs with feldspathic porcelains. However, clinical failures have been reported in substantial enough numbers to lead many laboratories to eliminate these porcelains from use. The types of failures reported typically are of a chipping or intra-porcelain nature rather than a catastrophic interfacial bonding failure.

Clinical Research Associates conducted a study that found an extremely high rate of this type of failure at 1-year recall. However, please note that the zirconium oxide frameworks performed very well with no fractures reported. The veneering porcelain failures do not exclusively lead to removal of the restoration and total replacement. Rather, in many cases, the fracture site can be smoothed and polished to the satisfaction of the patient and clinician. Nevertheless, this type of failure raises concerns regarding future performance.

The reader should be aware that high-strength, high-fusing (950°C) ceramic materials such as Vita VM 9 (Vident, Brea, CA, USA) are available for this process. The good clinical performance of these materials over the same framework systems suggests that the concern about the low-fusing materials is a valid one.

Input from the manufacturing community suggests that the cases in question were the result of the ceramist mishandling the material during fabrication. This is certainly a valid hypothesis, but it raises the unfortunate possibility that the level of training provided for the use of these materials has been inadequate and must be

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improved for the sake of the dental public.

As new indirect restorative technologies are introduced to the clinician and technician, a learning curve is always present. To the extent possible, we must be adequately prepared to adjust to new and different handling characteristics so that our patients need not serve as test subjects for new restorative options. Unfortunately, history shows that this has sometimes been the case. One example is the fiber-reinforced composite resin systems that were introduced for definitive full-coverage restorations.

This commentary is not intended to be critical of our colleagues in the manufacturing community. The research and development of improved methods for patient treatment is certainly important. This author's chief concern is that higher levels of training, perhaps with certification and validation of proficiency, would be of value in shortening the learning curve, thereby reducing the likelihood of early clinical failures.

SUGGESTED READING

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Editor's Note: If you have a question on any aspect of esthetic dentistry, please direct it to the Associate Editor, Dr. Edward J. Swift, Jr. We will forward questions to appropriate experts and print the answers in this regular feature.

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