

QUESTION:

Posterior all-porcelain restorations—where and why?

By Gregg A. Helvey, DDS | Matt Roberts | Michael R. Sesemann, DDS

Dr. Helvey



Patient demands for more esthetic posterior crowns have led manufacturers to develop metal-free monolithic and bi-layered ceramic systems. Bi-layered all-

ceramic crowns include ceramic-zirconia, glass-infiltrated zirconium-toughened alumina and ceramic-alumina crowns. Monolithic systems include full-contour zirconia and full-contour or partially layered lithium-disilicate crowns. There are clinical situations that can be a struggle between the patient and the clinician where an all-metal restoration is the only option but the patient insists on a more esthetic material. There are several factors that must be considered when selecting an all-ceramic crown system in the posterior region. The first is occlusal clearance. Depending on the material used, a minimum of 0.5 mm to 1 mm is necessary for all-zirconia; and a range of 1.5 mm to 2 mm is required for lithium disilicate, leaning toward the latter the further posterior the crown. The bi-layered type crowns should have a minimum of 2 mm of occlusal clearance.

The second factor is the type of cement that will be used. Certainly, a bonded restoration will have enhanced retention and the tooth preparation requirements for resistance and retention form become minimized. Isolation for the cementation step must then be considered and, depending on the location and the patient, this step may present some difficulty.

Third, we must consider the margin location. Studies show that resin bonding to enamel margins will have lower microleakage that bonding to dentin margins. In that situation, a cemented crown would have a greater chance of success than a resin-retained crown provided there is sufficient height of

the axial walls of the prepared tooth for retention.

The last factor to consider is the opposing tooth and the type of parafunctional activity the patient exhibits. It is imperative that the occlusal surface be highly polished after any occlusal adjustments have been made on all-ceramic crowns.

To answer the question of where and why? The where is anywhere the proper conditions exist after considering occlusal clearance, preparation design, margin location, cementation, and the opposing tooth. Why? Because we can.

Mr. Roberts



I think the more appropriate question would be to ask is whether there is any place that I would not use all-ceramic in the posterior. The only area I still look

to metal-ceramics is for some implant applications and long-span bridges, and many of these situations can be served with zirconia-based restorations.

My posterior restorative material of choice is lithium disilicate for single crowns or onlays restoring nicely colored teeth. The 400 MPa strength gives me the assurance that I will not see chipping. I use high-translucency lithium disilicate in its monolithic form to maximize the strength. The esthetic results are more pleasing than I see with porcelain-fused-to-metal or zirconia-based restorations. This material lends itself to two different fabrication options: pressable or millable.

In large, complex cases, I wax and press the posterior restorations at the same time I am doing the anterior veneers. This gives me full control of arch form and occlusal contacts, and allows me to design an occlusal scheme that is

harmonious for the patient. An added benefit is that the posterior blends seamlessly with the anterior from an esthetic perspective.

For single posterior restorations I use a milled approach, working with 3Shape and Diadem or CEREC® In Lab; I design and mill lithium disilicate in the blue phase, then make final adjustments by hand before crystallizing the restorations. I find that I can design much faster than I can wax, yet I achieve a nice result. Working in the virtual environment allows easy viewing of occlusal contact positions and restorative thickness at all times and achieves consistent quality control. This increased efficiency allows better profitability for the laboratory and results in cost savings for the patient.

Dr. Sesemann



Part of a clinician's value to our patients is our professional ability to select the proper material for a given restorative situation.

While metal restorations have proven to be an outstanding treatment option for posterior teeth, our patients' continued strong interest in tooth-colored restorations have made us seek and develop materials that can be clinically successful as posterior restorations for bicuspid and molar teeth. I find the following five factors to be part of my deliberation concerning material selection in posterior applications; the tooth's location in the mouth, dental anatomy considerations (both anatomical preservation and whether enamel is currently available), ascertaining the level of esthetic need, determining the degree of inherent material strength needed, and an analysis of the occlusal/functional parameters I must contend with for longevity.

For second molars, the occlusal stresses, limited clinical crown height, and restricted visibility make metal restorations my first choice for these teeth. An exception to the rule would be someone with a high esthetic need and/or someone who has a tooth with a lot of enamel where I could bond a high-strength, lithium-disilicate onlay, for example.

With bicuspid and first molars, if the tooth is visible in the smile I am inclined to lean toward an all-porcelain material that will blend imperceptibly with the optical metamorphisms of the natural anterior teeth, and/or other anterior restorations. This is exceedingly necessary in individuals with broad smiles and high lip dynamics. Both leucite-reinforced (adhesive application only) and lithium-disilicate (adhesive or cohesive application) all-porcelain restorations can be exceedingly natural in appearance. Variations in restoration design can alter its inherent strength. A decision to layer the restoration core with coverage porcelain can increase its esthetics, but can significantly reduce the strength of a restoration. For example, when force issues become increasingly significant, as in patients with unaddressed occlusal issues or parafunctional patients (nocturnal bruxism), the prevailing management concerns will limit my choices to a monolithic lithium-disilicate material or a porcelain-fused-to-metal option.

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