CASE REPORT

Deciding Which Material and Technique to Use for Esthetic Restorations: Case Report

By Richard Trushkowsky, DDS

A 25-year-old woman presented with an extensive amalgam in tooth No. 19 (Figure 1) with the distal lingual cusp fractured. To conserve as much tooth structure as possible, a composite onlay (belleGlass™, Kerr Corporation) was selected. The laboratory hadn't incorporated the newer Premise Indirect. (Kerr Corporation). This material utilizes the same trimodal curing like belleGlass Ng to achieve 98% material conversion. The opacity of the facial dentin (formerly translucent dentin) layer was increased to improve the shading over metal. According to the manufacturer the incorporation of large prepolymerized filler particles, 0.4 mm structural filler and small nanoparticles allows higher filler loading, improved physical properties, optimal handling, higher surface gloss and reduced polymerization shrinkage. A gold onlay and ceramic onlay were also considered. The patient did not want gold despite being informed of its longevity; in addition, her history of recurrent decay also precluded this as a selection. A ceramic onlay, such as leucite-reinforced glass ceramic, lithium disilicate, aluminum oxide, zirconium, or CAD/CAM-generated ceramic restorations were also considered. A CAD/CAM-generated restoration could be fabricated in the same visit and a provisional restoration would not be required. A ceramic restoration would wear less than a composite restoration. This should be considered if an entire arch is being restored and especially if the patient is a bruxer, as vertical dimension can be more readily maintained. If the patient has natural teeth or gold in the opposing arch, composite or gold would be preferred to reduce wear on the opposing teeth. Because the patient had natural teeth in the opposing arch and, in the author's experience, a better color match had been achieved with indirect composite restorations and less ditching of the margins, indirect composite was selected. Composite also can be more readily repaired than ceramic. However, if another material had been selected, each one may have a different bonding protocol to ensure longevity. If gold had been selected, the preparation is different.[1]

The patient was anesthetized with mepivicaine 2%. The tooth was prepared with axial walls at approximately 10° of taper, which allows for easier placement and removal during try-in. The occlusal isthmus was made at least 2 mm wide, except at the junction with the mesial in order not to weaken the buccal and lingual cusps at this juncture. Line angles were rounded to reduce stress in the final restoration that could cause failure. The pulpal floor in the central fossa area should have a thickness of 1.5 mm to 2 mm to provide room for the opposing cusp. Occlusal margins should be with a 90° cavosurface angle to avoid a thin layer of composite (Figure 2). The placement of a translucent composite material in this area allows the underlying dentin to show through and create a more natural transition (Figure 3 through Figure 7).[2-5]

To minimize or eliminate sensitivity, the dentin can be sealed immediately either with a total-etch procedure or a self-etch procedure.6-8 The tooth can be sealed with the bonding agent and technique of choice. The oxygen-inhibited layer of the freshly bonded surface has to be removed with alcohol. The final impression was obtained with Standout™ (Kerr) (Figure 8). This material is no longer sold; currently Take 1® Advanced™ (Kerr), a vinylpolysiloxane (VPS) impression material would have been used. The counter was obtained with AlgiNot FS™ (Kerr), an alginate alternative. The advantages of this material are no hand mixing, no mess, easy clean-up, saves time, it can be poured immediately or at a later date, it can tolerate disinfection, and it can be dispensed with a cartridge or automix device. Before fabrication of a resin-based provisional, a separating medium needs to be applied to prevent the provisional from bonding to the surface. Bisco recently introduced Pro-V-Coat™ for this purpose. One to two drops of Pro-V-Coat are dispensed into a mixing well and then, using a brush, one to two coats are applied to the entire preparation. Note, however, that approximately 1 mm at the cavosurface margin should not be covered to allow a seal of the margin. Fill-In™ (Kerr), a two-component (catalyst and base) in a unidose delivery was used to fabricate a provisional restoration that was luted with TempBond NE™ (Kerr) in a unidose. The laboratory fabricated a belleGlass NG onlay.

The area was anesthetized with mepivicaine 2% and then isolated. The patient also had a class V lesion on tooth No. 21 that needed to be restored. The tooth was excavated and prepared with a slight bevel on the occlusal margin of the preparation. The provisional was removed and OptiClean™ (Kerr) was used to completely remove the temporary cement. OptiClean's handle is an aromatic polyamide and the conical tip contains 40 µ m of aluminum oxide abrasive (Figure 9).

The restoration was tried in and the contacts checked with dental floss. A try-in gel can be used to determine color match if necessary. The author feels this usually is not necessary and that if the appropriate shade is selected it will blend sufficiently after light-curing. If a try-in gel is used, it must be thoroughly washed from the preparation because it will interfere with bonding. The intaglio surface of the restoration was sandblasted with 50 µm aluminum oxide with a Microetcher ERC (Danville Materials, San Ramon, CA). A silane primer was then placed on the sandblasted surface and allowed to air-dry, and then dried lightly with an air syringe and set aside.

The tooth that had been isolated had 37% phosphoric-acid etchant placed on the enamel

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FIG. 1

FIG. 3


FIG. 2

(1.) Figure 1 Tooth No. 19 with amalgam removed and prepared for belleGlass onlay.
(2.) Die model of tooth No. 19 demonstrates the preparation design.
(3.) A technician places the dentin layer.

for 5 seconds, then the dentin was covered for an additional 10 seconds. The etchant was rinsed off with a copious amount of water. A high-volume suction was used to remove excess water and then the tooth was blotted to leave the dentin slightly moist. OptiBond® Solo Plus™ (Kerr) was placed with a microbrush and a light scrubbing action. OptiBond Solo Plus combines the primer and adhesive together. Excess material should be removed to prevent pooling, especially in the line angles. Air was then used to drive off the solvent and then the tooth was light-cured for 20 seconds. An alternative bonding material that can be used is OptiBond FL® (Kerr) that is also available in a unidose. First the primer is placed and air-dried, and then the adhesive is placed. The NX3 Nexus® Third generation (dual-cure in the automix syringe) (Figure 10) is placed on the internal aspect of the restoration and can be placed into the preparation. If the restoration is not too opaque and the restoration thickness is 2 mm or less, the light-cure component in the NX3 Nexus Third generation kit can be used. This is compatible with a self-etch or total-etch protocol and no dual-cure activator is required.

Excess cement was cleaned off with a brush and dental floss while the restoration was held in position. The restoration was tacked into position from the buccal, occlusal, and lingual for 5 seconds, and then excess (which is in a gel stage) was removed with instruments and floss. The restoration was then cured from the buccal, lingual, and occlusal for 40 seconds. After any occlusal adjustment (Figure 11), all of the margins and the entire surface were etched with 37% phosphoric acid and sealed with OptiGuard® (Kerr) (which is a fluoride-releasing, unfilled, light-cured resin) to seal the margins and fill any microcracks created by the finishing process.

Tooth No. 21 was then restored (Figure 12). OptiBond® All-In-One Unidose™ (Kerr) was opened and an applicator brush inserted into the container to saturate the tip. The OptiBond All-In-One adhesive was applied with a brushing motion for 20 seconds. The adhesive was dried with gentle air initially and then with medium air for at least 5 seconds with oil- and water-free air. The material was then light-cured for 10 seconds. Herculite® Ultra A2 (Kerr) was then placed in increments. The final polish was achieved with an OptiDisc® (Kerr) (Figure 13) which is color-coded and available in four grits: Extra Fine, Fine, Coarse/Medium, and Coarse for gross reduction. The final restoration demonstrates an excellent shade match even with only one shade (Figure 14).

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FIG. 4


FIG. 5

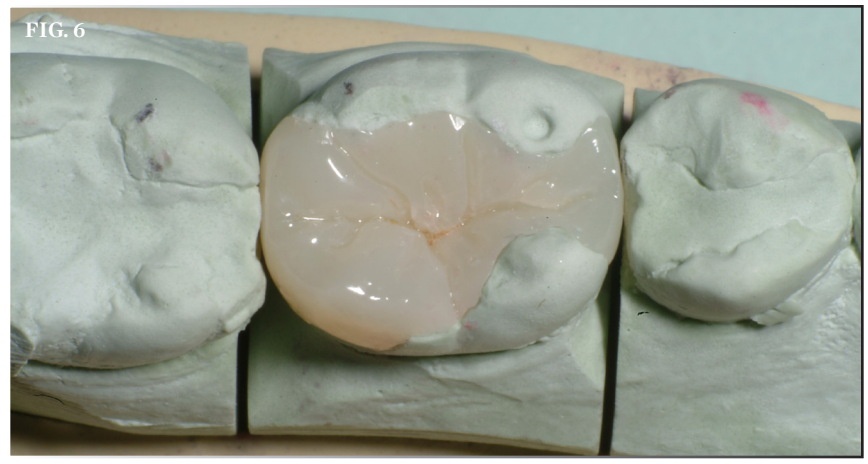
FIG. 6

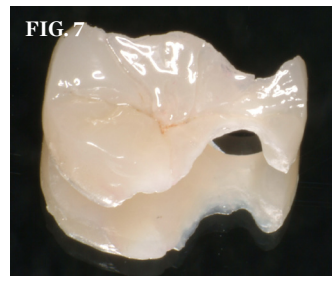
FIG. 7

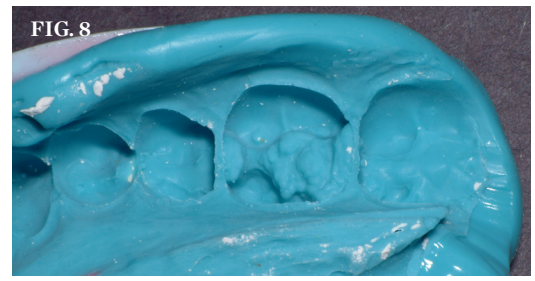
FIG. 8


FIG. 9

FIG. 10


FIG. 11


FIG. 12


FIG. 13


FIG. 14

(4.) A technician carves the occlusal anatomy. **(5.)** A technician initiates one of several polishing steps. **(6.)** The final restoration on the die model illustrates the depth of color that can be achieved. **(7.)** The final restoration with translucent margins allows the tooth structure underneath to show through. **(8.)** Final quadrant impression delineates all of the margins. **(9.)** An OptiClean tip in a contra-angle handpiece is used to clean off excess cement. **(10.)** NX3 (dual-cure in the automix syringe) is used to place cement on the restoration. The light-cure only component (single syringe) can be used if the restoration is not too thick or opaque. **(11.)** The final bonded restoration. **(12.)** Tooth No. 21 prepared for a class V composite **(13.)** A Herculite Ultra restoration on tooth No. 21 was polished with an OptiDisc. **(14.)** The final restoration demonstrates excellent blending even before tooth is totally rehydrated.