Aesthetic Laboratory Fabrication of Composite Resin Crowns Over Metal Composite Copings

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Clinicians have the incumbent responsibility to provide their patients with dental care that restores them to ideal health and function. Indirect resins offer one such treatment option for dental practitioners seeking to use biocompatible, aesthetic restorations in daily patient care. Several composite resin systems (eg, Tescera ATL, Bisco, Schaumburg, IL; belleGlass NG, Kerr/Sybron, Orange, CA) are currently used in laboratories around the industry to respond to these imperatives. Indirect resin systems use a variety of light-, heat-, and pressure-curing units to eliminate porosities and imperfections in resin materials, resulting in a restoration that instills the aesthetics, function, and marginal integrity of a laboratory-fabricated restoration with the handling and biocompatibility of a resin restoration.

Such indirect resin restorations can be used in combination with metal composite copings (ie, Captek, Precious Chemicals, Altamonte Springs, FL). The resulting restoration thus benefits from the biocompatibility of both materials and exhibits a warm, natural gingival margin. As a result of the physical properties of gold, the metal composite coping may reduce internal stresses within the layers of the restoration. In the case that follows, a laboratory protocol for the fabrication of indirect composite resin-to-metal composite copings is presented. While this combination provides the advantages of both materials, the long-term performance of these restorations must be closely monitored before this combination can be utilized with the predictability of other restorations (eg, gold, porcelain, resin) currently available to the restorative team.

Case Presentation

A 29-year-old female presented with a pre-existing composite crown on tooth #3(16) and a porcelain crown on tooth #4(15). The clinical and radiographic examination revealed that the composite crown on tooth #3 had been perforated occlusally to facilitate access during root canal therapy; the porcelain crown on tooth #4 was overcontoured and positioned too far buccally. A treatment plan was formulated and would require the replacement of the existing restorations with indirect resin restorations that would provide ideal function and aesthetics for the patient.

Figure 1A. Shade selection was completed prior to treatment. A proper shade match was determined by comparing a dentin and an incisal shade.

Figure 1B. Postoperative buccal view of the definitive restorations (ie, Tescera ATL, Bisco, Schaumburg, IL; Captek, Precious Chemicals, Altamonte Springs, FL) on teeth #3 and #4.

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2A

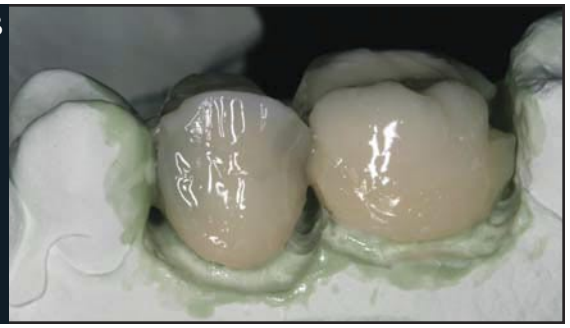
2B

3A

3B

4A

4B



5A

5B

6A

6B

Figures 2A,B,C. The patient's existing crowns on teeth #3 and #4 were removed. Using a diamond bur (ie, 845-KR-025, Brasseler USA, Savannah, GA), the preparation and margins were redefined for the anticipated full-coverage crowns. The occlusion reduction was 1.5 mm, and the buccal and lingual reductions were 1.2 mm. A full-arch impression was made of the final preparations, and a bite registration was obtained. While the patient was provisionalized, the laboratory phase began with the creation of models and trimmed dies. These dies were used to create duplicate and refractory dies that yielded the metal composite copings.

Figures 3A,B,C. A coupling agent (ie, Universal Porcelain Coupler, Captek, Precious Chemicals, Altamonte Springs, FL) was then applied to create a mechanical bond to the copings. A thin wash of opaque resin (ie, Tescera ATL, Bisco, Schaumburg, IL) was then applied, worked into the bonding agent, and light cured. This wash coating allowed the gold substructure to shine through and established a proper bond. A second layer of opaque resin was then applied in a thin layer and light cured. This instilled a warm, opaque effect in the restorations but concealed the gold color of the copings. Additional layers and colors were applied in a multilayer buildup technique to mimic the natural dentition.

Figures 4A,B,C. The internal characterizations of the restorations comprised different body and cervical colors. Since the patient was still considering having her teeth whitened, the laboratory fabrication process involved multiple incisal-shaded resin materials and translucent effects. The thixotropic handling of the indirect composite resin material enabled natural morphology to be efficiently created in the crowns.

Figures 5A,B,C. The composite resin buildup continued with the development of the intended morphology for the full-coverage crowns. Once this was completed, the technician verified the occlusion (including the Curve of Wilson and Curve of Spee), made any necessary adjustments, and cured the restorations (ie, Tescera ATL Heat Cup, Bisco, Schaumburg, IL). At this time, the final polish for the restorations was rendered.

Figures 6A,B,C. The definitive indirect composite resin-to-metal composite crowns (ie, Tescera, Bisco, Schaumburg, IL; Captek, Precious Chemicals, Altamonte Springs, FL) had a vibrant, natural appearance upon completion of the laboratory procedure. These full-coverage crowns were forwarded to the clinician for seating with a conventional cementation technique that required no sandblasting or etching.

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