

Improving Anterior Esthetics With All-Ceramic Restorations

Layer-free zirconium oxide material masks endodontic post while providing strength and lifelike translucency

J.A. Reynolds, DDS | Matt Roberts, CDT

The lockdowns and social distancing restrictions imposed during the COVID-19 pandemic pushed millions of business professionals out of the workplace to work remotely from home. As that trend continues in 2021 and beyond, interpersonal office, classroom, workshop, trade event, and conference table interactions have been replaced with virtual meetings, remote video conferencing, and one-on-one video calls through the high-resolution lenses of computer cameras. Virtual instead of in-person interaction has become commonplace.¹

With businessmen and women spending hours each day staring at their own faces on their computer screens, many focused more attention on their appearances,² especially their smiles. In addition, although there has always been a strong

connection between our external appearance and internal sense of health and well-being that motivates us to want to project a positive image to others with whom we communicate, social media in all its forms has impacted the perception of smile esthetics and increased the demand for dental procedures to enhance the vitality of patients' smiles.^{3,4}

Case Report

A long-time female patient in her early 70s presented to the practice unhappy with the unesthetic shade and shape of tooth No. 10 (Figure 1). Many years earlier, the tooth had

been endodontically treated, and a metal post was inserted to rebuild and strengthen the tooth for placement of a metal-ceramic crown (Figure 2), which was designed to mask the underlying color of the post.

Upon examination, the clinician alerted the patient to the presence of chipping on the mesial surface of tooth No. 8, which he suggested that they also address, as well as the discoloration of teeth Nos. 7 and 9 (Figure 3). The preferred treatment plan that was recommended involved placing all-ceramic restorations for teeth Nos. 6 through 11. After the patient agreed to treatment, the clinician acquired a series of retracted and unretracted preoperative photographs for communication with the laboratory.

At the preparation appointment, the patient was anesthetized, the crown on tooth No. 10 was removed, and teeth Nos. 6 through 11 were prepared to receive full-contour crowns. To communicate the stump color to the laboratory, the preparations were photographed with a shade tab (IPS Natural Die Material Shade Guide [ND-7], Ivoclar Vivadent) (Figure 4) and then digitally scanned (Trios[®] 4, 3Shape). Temporary restorations were created using a premade splint fabricated from the



FIG. 1



FIG. 2



FIG. 3

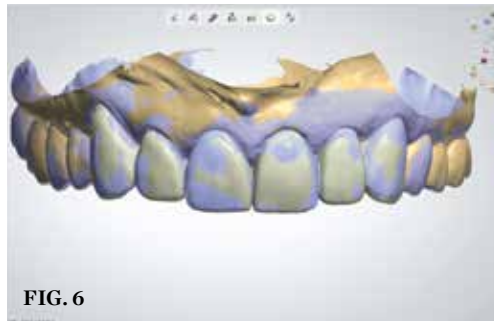


FIG. 4

(1.) Pretreatment full-face portrait of a patient concerned about the unesthetic nature of tooth No. 10. (2.) Pretreatment palatal view of the maxillary anterior teeth. Tooth No. 10 had been endodontically treated with a metal post and metal-ceramic crown. (3.) Close-up retracted facial view with the teeth apart showing chipping on tooth No. 8 as well as the discoloration of teeth Nos. 7 and 9. The preferred treatment plan was to restore teeth Nos. 6 through 11 with all-ceramic crowns. (4.) The prepared teeth were photographed along with a shade tab to communicate the stump color to the laboratory.

J.A. REYNOLDS, DDS
Accredited Member
American Academy of Cosmetic
Dentistry
Private Practice
Franklin, Tennessee

MATT ROBERTS, CDT
Accredited Member
American Academy of Cosmetic
Dentistry
Owner
CMR Dental Laboratory
Idaho Falls, Idaho



(5.) A line defining the oral cavity was drawn to create a zone of translucency so that the design of the proposed restorations could be evaluated. (6.) The scan of the provisional restorations was used as a guide to design the shape, form, and position of the final restorations. (7.) The six full-contour crowns were milled with subtle surface texture for the addition of shading liquids prior to staining and sintering. (8.) The final stained and glazed restorations exhibited a natural level of translucency and a seamless gradient transition from dentin to enamel. (9.) Posttreatment full-face portrait. (10.) Posttreatment close-up right lateral view of the final restorations.

original diagnostic design (PerfecTemp® II, DenMat). After the temporary restorations had remained in place for several weeks, the patient reported that she was pleased with the function and esthetics.

At the Laboratory

A photograph of the temporized patient smiling and looking directly into the camera was uploaded into CAD software (3Shape Dental Designer Premium, 3Shape). Using the software's tools, the interpupillary and perpendicular midlines were established to orient the photograph in facial context and straighten the image to the overall esthetic plane, correcting a slight cant of the temporary restorations that was noted by the clinician. A scan of the temporary restorations was aligned with the photograph, and a scan of the digital model was superimposed to ensure that complete alignment was achieved. Next, a boundary of translucency was established in the photograph by drawing a line around the inner lip line. This allowed the proposed 3D digital design to show through so that it could be confirmed to be in harmony with the upper and lower face (Figure 5).

The scan of the temporary restorations was used as a guide to design the shape, form, and position of the final all-ceramic restorations as well as to evaluate different layering

textures to create translucency and add characterization (Figure 6). Once completed, the final design was imported into the CAD software's dynamic virtual articulator for a functional evaluation.

For this case, it was critical to select a restorative material that had the ability to mask the post and core of the endodontically treated tooth while exhibiting maximum translucency and esthetics. The technician chose to use a new high-strength zirconium oxide restorative material (IPS e.max® Prime Esthetic, Ivoclar Vivadent) because its layer-free progression of shade and translucency offers coordinated opacity in the cervical region with high levels of translucency in the incisal region for optimal esthetics with 850 MPa of strength.

Following confirmation of the selected material, the six full-contour crowns were milled (PrograMill PM7, Ivoclar Vivadent) with subtle surface texture for the addition of shading liquids prior to staining, glazing (IPS Ivocolor, Ivoclar Vivadent), and sintering (Figure 7). The completed final restorations exhibited a natural level of translucency and a seamless gradient transition from dentin to enamel (Figure 8).

Try-In and Cementation

After the clinician anesthetized the patient and tried in the restorations to assess their

fit, function, and esthetics, each crown was cleaned and cemented using a resin-modified glass-ionomer cement (RelyX™ Luting Plus, 3M). The patient expressed that she was thrilled with the outcome (Figure 9 and Figure 10). 🌸

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FOR MORE INFORMATION, CONTACT:

Ivoclar Vivadent
 ivoclarvivadent.com
 800-533-6825