

Hands On

USING PRESSED LITHIUM DISILICATE TO REPLACE CAST GOLD RESTORATIONS

High-strength esthetic materials ensure optimal fit, function, and patient satisfaction

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UNTIL THE LATE 1990S, when patients presented at the dental practice with damaged or diseased teeth, it was considered the standard of care to place cast gold restorations in regions of the mouth where restorative work needed to have good fit, durability, clinical longevity, and a low incidence of allergy.¹⁻³ Today's patients, however, being more educated about the available options, want metal-free solutions to fulfill their restorative requirements. In addition to simply wanting functional, painless restorative process, patients want the most esthetically pleasing solutions possible.

Advancements have been made in ceramic material science, yielding a compound that is comparable to cast gold in fit, durability, and clinical longevity, but that also exhibits optical properties similar to those of natural teeth. These advancements include the development of lithium disilicate (IPS e.max[®] Press, Ivoclar Vivadent, www.ivoclarvivadent.us) glass ceramic. IPS e.max Press consists of approximately 70% needle-like lithium disilicate crystals in a glassy matrix. This material demonstrates a flexural strength of 400 MPa for exceptional wear resistance, a low refractive index for optimal

translucency that mimics natural teeth,⁴ and can be adhesively bonded or traditionally cemented.^{5,6} These characteristics allow clinicians to confidently place lithium disilicate IPS e.max Press restorations anywhere in the oral cavity, as demonstrated the following case presentation.

Case Presentation

A 48-year-old male patient presented with failing cast gold restorations that were placed 20 years earlier. At that time, gold restorations were the best option in terms of fit and durability. However, over time they became worn.

The patient exhibited a fracture on tooth No. 5, tooth No. 3 was broken, and he had an overall loss of vertical dimension due to bruxism (Figure 1 through Figure 3). A treatment plan was discussed with the patient that involved replacing the cast gold restorations with IPS e.max Press lithium disilicate crowns due to their strength, durability, and esthetics.

A diagnostic wax-up of the patient's proposed restorations was made (Figure 4). The patient's teeth were prepared (Figure 5), and a clear, vacuum shelf was molded on the diagnostic wax-up for creating the temporary crowns for the patient. The vacuum shelf was placed in the patient's mouth to verify fit (Figure 6), after which the provisional restorations were made. The patient wore the temporaries while the permanent crowns were being fabricated (Figure 7 and Figure 8).

Laboratory Technique

The diagnostic wax-up models that were used to produce the temporary restorations were also



Fig 1. Preoperative view of the patient.

Fig 2. Close-up of preoperative view showing the visible fracture of tooth No. 5.

Fig 3. Occlusal preoperative view.

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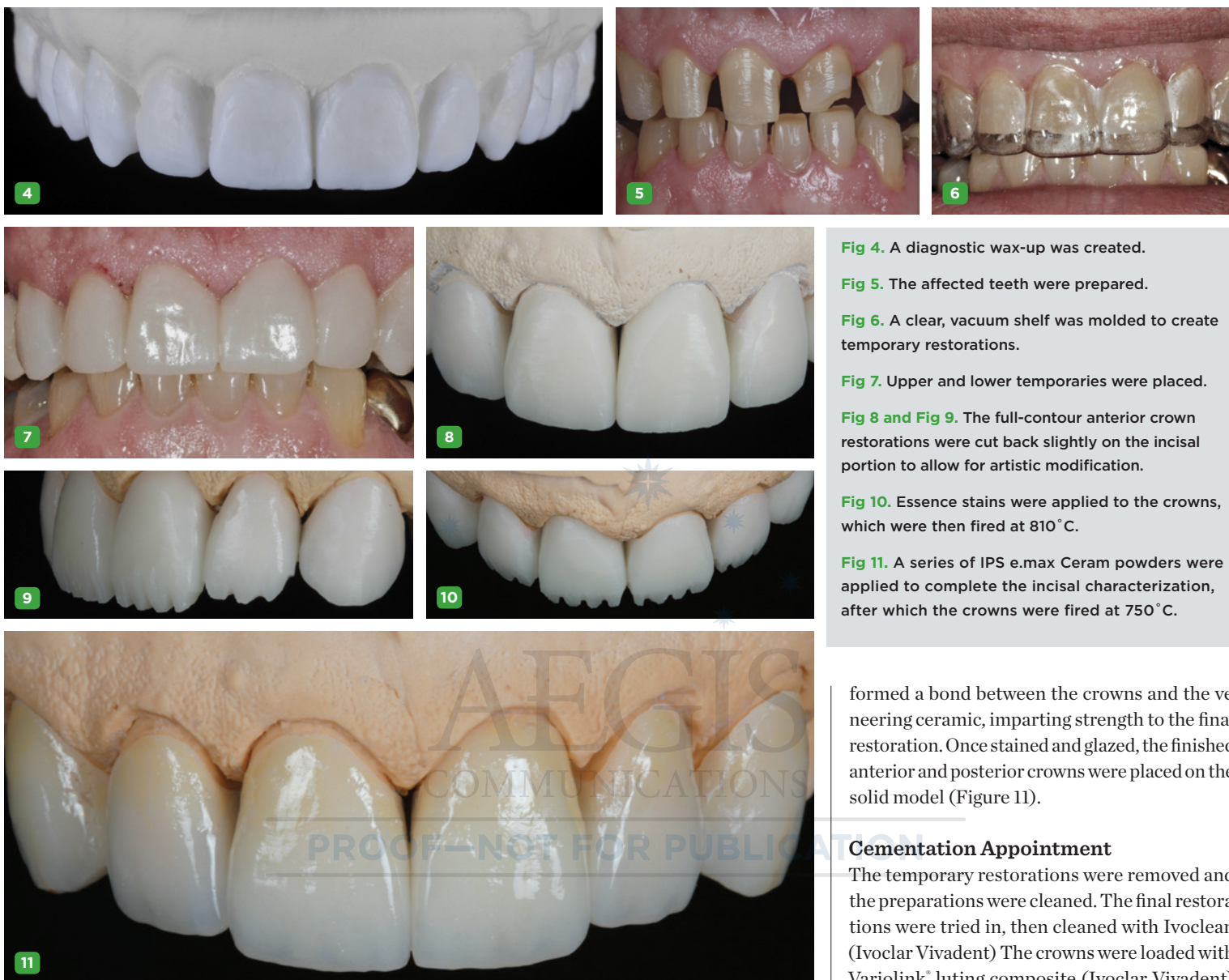


Fig 4. A diagnostic wax-up was created.

Fig 5. The affected teeth were prepared.

Fig 6. A clear, vacuum shelf was molded to create temporary restorations.

Fig 7. Upper and lower temporaries were placed.

Fig 8 and Fig 9. The full-contour anterior crown restorations were cut back slightly on the incisal portion to allow for artistic modification.

Fig 10. Essence stains were applied to the crowns, which were then fired at 810°C.

Fig 11. A series of IPS e.max Ceram powders were applied to complete the incisal characterization, after which the crowns were fired at 750°C.

formed a bond between the crowns and the veneering ceramic, imparting strength to the final restoration. Once stained and glazed, the finished anterior and posterior crowns were placed on the solid model (Figure 11).

Cementation Appointment

The temporary restorations were removed and the preparations were cleaned. The final restorations were tried in, then cleaned with Ivoclean (Ivoclar Vivadent) The crowns were loaded with Variolink® luting composite (Ivoclar Vivadent), seated onto the preparations, and light cured according to the manufacturer's instructions. All excess cement was removed (Figure 12 through Figure 14v). IPS e.max Press lithium disilicate veneers (Ivoclar Vivadent) were placed on teeth No. 22 through No. 27, and a NobelActive™ implant (Nobel Biocare, www.nobelbiocare.com) was inserted for tooth No. 3.

Conclusion

Twenty days after cementation, the patient was examined at a recall appointment. He had no discomfort or sensitivity, and the restorations displayed remarkably life-like esthetics, fit, and function (Figure 15 through Figure 18).

By using a high-strength yet highly esthetic

used to create the matrices for the definitive crowns. The wax was sprued, invested, and burned out. It was then pressed with the appropriate IPS e.max ingots into full-contour form.

The full-contour anterior veneers were then cut back slightly on the incisal portion to allow room for artistic modification (Figure 8 and Figure 9). Stains and glaze paste were then applied to the crowns to create natural-looking surface and internal effects. Shade 1, Essence 1 (white), Essence 4 (copper), Essence 16 (profundo), and Essence 2 (vanilla), were applied to the cervical and middle thirds. The restorations were then fired at 810°C. During this step, the internal stain technique was applied up to the

incisal third, after which the cervical and middle third were finished externally (Figure 10).

Next, a series of IPS e.max® Ceram (Ivoclar Vivadent) powders were added to complete the incisal characterizations. No transparent incisal ceramic was used. To better control the value of the restorations, Enamel Opal shades EO1 and EO4 were blended and applied, in addition to Transpa Blue, Inter Incisal White-blue, Incisal Edge, and Dentine A1. The crowns were fired at 750°C with 1-minute hold, at a heat rate of 50°C per minute.

A final glaze was applied and the restorations were fired a final time at 770°C with a 5-second hold, at a heat rate of 99°C per minute. This



Fig 12 through Fig 14. The definitive crowns were tried in, cleaned with Ivoclean, and cemented with Variolink luting composite according to the manufacturer's instructions.

Fig 15 through Fig 17. IPS e.max Press veneers were placed on teeth No. 22 through No. 27, and a NobelActive implant was inserted for tooth No. 3.

Fig 18. The patient's mouth at the four month follow-up appointment.



material such as IPS e.max Press lithium disilicate, the ceramist for this case was able to realize the esthetic goals of the patient while providing restorations that, unlike the previously placed cast gold, will maintain their shape and functionality long term.⁶

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