Replacing Restorations Using Pressed Lithium Disilicate

Esthetics, durability, and functionality anywhere in the mouth

Rafael Santrich, CDT

All-ceramic restorations have long been considered the standard of care for restoring anterior dentition. Until the late 1990s, however, it was common practice to place cast old restorations when patients presented at the dental practice with damaged or diseased posterior teeth. In the posterior regions of the mouth, where restorative work needed to have good fit, durability, clinical longevity, and a low incidence of allergy, cast gold was historically the material of choice.[1-3] Today's patients, however, being more educated about the available options, want metal-free solutions to fulfill their restorative requirements regardless of position within the mouth. In addition to simply wanting functional, painless restorative process, patients want the most esthetically pleasing solutions possible.

Advancements in ceramic material science have enabled the development of lithium disilicate glass ceramic (IPS e.max® Press, Ivoclar Vivadent, www.ivoclarvivident.us). This unique glass ceramic formulation is comparable to cast gold in fit, durability, and clinical longevity, but also exhibits optical properties similar to those of natural teeth. 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.

RAFAEL SANTRICH, CDT
President and Owner
VM Lab Technologies
Aventura, Florida

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). At the same time, the patient opted to restore his worn anterior dentition to correct the wear and produce a more esthetic smile. 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 through Figure 6). The patient's teeth were prepared (Figure 7), 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 8), after which the provisional restorations


FIG. 1


FIG. 2


FIG. 3

CASE PRESENTATION (1.) Preoperative view of the patient. **(2.)** Close-up of preoperative view showing the visible fracture of tooth No. 5. **(3.)** Occlusal preoperative view.

were made. The patient wore the temporaries while the permanent crowns were being fabricated (Figure 9 and Figure 10).

Laboratory Technique

The diagnostic wax-up models that were used to produce the temporary restorations were also 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. This created the basis not only for the anterior restorations that would be subsequently cutback and layered, but also for the posterior restorations that would be simply characterized in their monolithic form.

The full-contour anterior veneers were then cut back slightly on the incisal portion to allow room for artistic modification (Figure 11 through Figure 13). Stains and glaze paste were then applied to the crowns to create natural-looking surface and internal effects. Shade 1 was applied to the cervical regions to enhance the chroma of the restorations and Essence 1 (white), Essence 4 (copper), Essence 16 (profundo), and Essence 2 (creme), were applied to the incisal third to create a more natural internal incisal effect (Figure 14).

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 Areola, and Dentine A1. The crowns were fired according to the manufacturer's instructions, contoured, and glazed.

Stains and glaze were applied and fired to the posterior restorations to create subtle characterizations as well as to blend the final shade to that achieved in the layered anterior restorations. By homogenously bonding to the surface of the restorations, the glazing process not only provides a sealed, sanitary surface, but also imparts strength to the final restoration. Once stained and glazed, the finished anterior and posterior crowns were placed on the solid model (Figure 15 through Figure 17).

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 18 through Figure 20). IPS e.max Press lithium disilicate veneers (Ivoclar Vivadent) were placed on teeth No.


FIG. 4


FIG. 5


FIG. 6


FIG. 7


FIG. 8


FIG. 9


FIG. 10

TREATMENT PROGRESSION (4.) A diagnostic wax-up was created. **(5.)** Right lateral view of the diagnostic wax-up. **(6.)** Left lateral view of the diagnostic wax-up. **(7.)** The affected teeth were prepared. **(8.)** A clear, vacuum shelf was molded to create temporary restorations. **(9. AND 10.)** Upper and lower temporaries were placed.

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 21 through Figure 23).

By using a high-strength yet highly esthetic 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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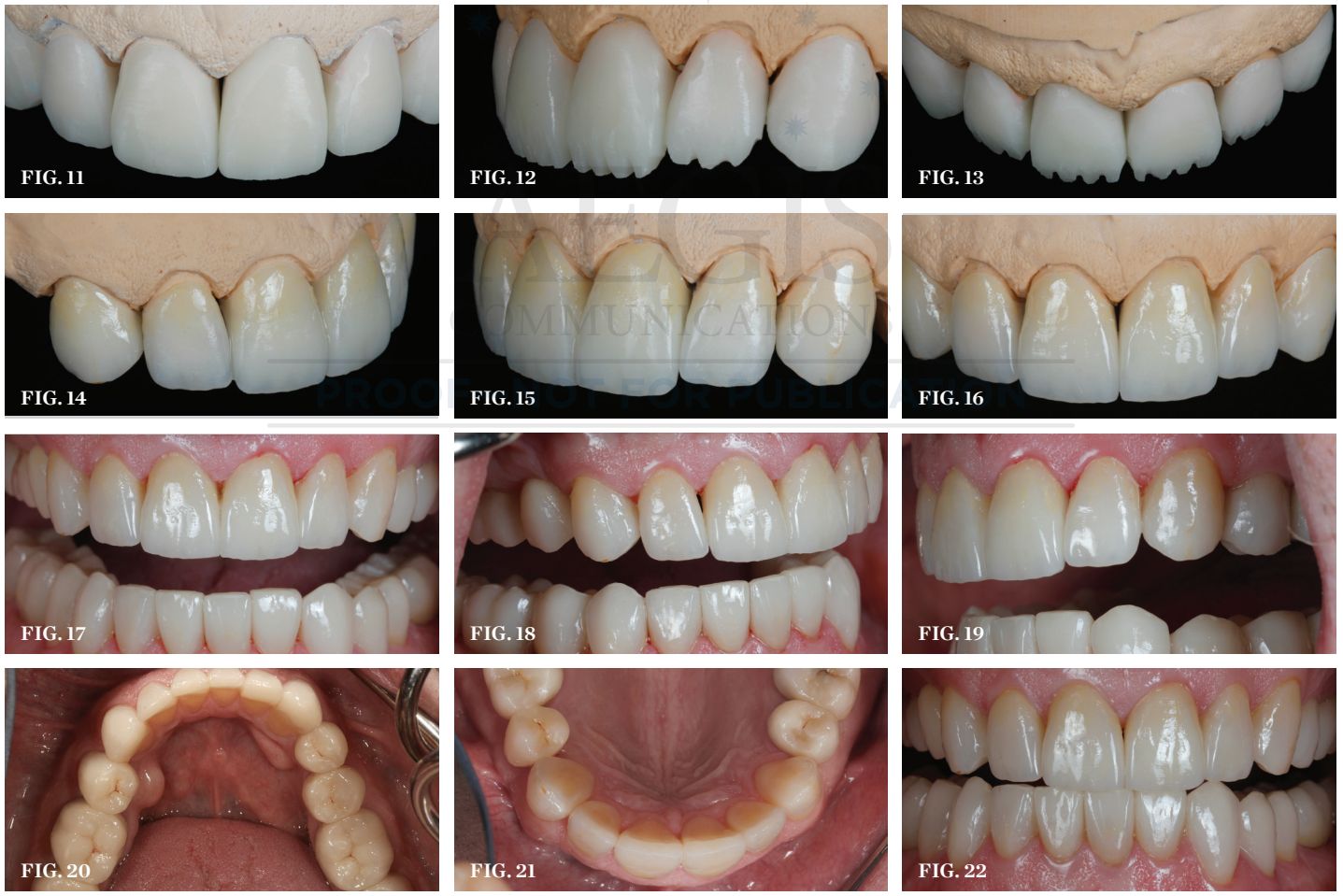

CASE COMPLETION (11. AND 12.) The full-contour anterior crown restorations were cut back slightly on the incisal portion to allow for artistic modification. **(14.)** Essence stains were applied to the crowns, which were then fired at 810˚C. **(15. THROUGH 17.)** A series of IPS e.max Ceram powders were applied to complete the incisal characterization, after which the crowns were fired at 750˚C. **(18. THROUGH 20.)** The definitive crowns were tried in, cleaned with Ivoclean, and cemented with Variolink luting composite according to the manufacturer's instructions. **(21. AND 22.)** IPS e.max Press veneers were placed on teeth No. 22 through No. 27, and a NobelActive implant was inserted for tooth No. 3.