Put to the Ultimate Test

Dental technicians routinely produce monolithic crowns and partially veneered mandibular posterior bridges. As a result, they get very excited when something different and highly challenging comes along, such as the individual incisor described in this article. In these situations, efficiency and profitability become secondary. The dental technician just has to take one quick look at the natural adjacent teeth to get the creative juices flowing. As the color, anatomy and individual details of the teeth are registered, possible outcomes are immediately visualized. The following account is a case in point.

The patient’s wishes and the solution

As a teenager, the now 24-year-old female patient had fractured tooth 9. The tooth had been repaired with layered composite resin. At a later stage, the tooth received a resin crown. This restoration, however, had a rather lifeless appearance and looked awkward in comparison with the neighboring teeth. Its unattractive appearance was further emphasized by teeth whitening (Fig. 1). The patient wished for a tooth with “perfect shade and anatomy.” This demanded great technical and creative skill on the part of the dental technician and of course the use of suitable materials.

We decided to use IPS e.max ZirCAD Prime from Ivoclar Vivadent for various reasons. The fact that the discs are produced according to a new manufacturing technique called Gradient Technology (GT) was a decisive criterion. In this process, the raw materials 3Y-TZP (high-strength zirconia) and 5Y-TZP (highly translucent zirconia) are combined to produce a layer-free material showing a seamless progression of shade and translucency and a very homogenous microstructure. In the present case, the stained tooth was prepared with a rounded shoulder in order to accommodate the all-ceramic restoration (Fig. 2). The IPS e.max ZirCAD Prime zirconia provided the prerequisites for covering the relatively dark prepared tooth and at the same time for fulfilling the high esthetic expectations of the patient.
A passion for esthetics

The crown was designed in slightly reduced form with the CAD program. The reduction in the incisal area was greater than in the cervical part of the crown. This served to provide enough space for customizing the incisal area with individual layers. In the thicker cervical part of the crown we took advantage of the high opacity to mask the dark tooth preparation. The CAM software established the exact position for the crown within the disc. The milled IPS e.max ZirCAD Prime restorations were processed using speed sintering programs. The sintered restoration in this case showed accuracy of fit on the model immediately after firing (Fig. 3).

The crown was imparted with lifelike characteristics using the IPS e.max Ceram base shade BL1 (Figs. 4-5). The unusually light color of our patient’s teeth presented a major challenge. In cases such as the present one, the Enamel and Effect materials of the IPS e.max Ceram Selection assortment offer freedom to apply the individualized layers to the restoration. The brightness of the tooth is easy to control and natural-looking effects can be created. We placed special emphasis on reproducing the incisal dentin structure. Tooth 8 showed a distinct bluish translucent incisal area with dentin lobes running through it. Nevertheless, the incisal edge was comparably opaque. The shape and play of color as well as the in-
ner structure and the surface texture of the natural adjacent tooth were reproduced successfully. Stains and glazes were used to give the restoration the appropriate finish and surface gloss. Figure 6 shows the completed restoration on the model.

The moment of truth

The try-in appointment could not have gone better. The crown showed impeccable fit and it looked lovely. The photos shown in Figures 7 and 8 were taken when the crown was tried in. Despite a very challenging situation involving very light teeth on the one hand and a dark tooth preparation on the other, IPS e.max ZirCAD Prime effectively masked the stained tooth structure in the cervical area and at the same time looked lifelike as a result of the recreated mamelons and the built-up translucent segments. The play of light and color

Figure 6
The completed crown on the model.

Figs. 7-8
Try-in: Despite the lifelike translucency of the restoration, the stained tooth structure is effectively masked by the crown.
intensified toward the incisal edge and produced a harmonious overall result, which allowed the tooth to blend in smoothly with the natural adjacent teeth. The patient’s wish for “perfect shade and anatomy” has been fulfilled (Figs. 9-10).

**Impressive result**

The patient is proud of her smile, the attending dentist is more than satisfied with the outcome and the dental technician is delighted because this type of work is immensely satisfying. Exciting cases involving high-end esthetics cannot be routinely expected, however, in the dental practice and laboratory, commercial success requires good economic thinking. Therefore, it is gratifying to know that an all-ceramic solution is available which is suitable for many different indications.

Figure 9
The shape and color of the new crown on tooth 9 blend in smoothly with the surroundings

Figure 10
Excellent, highly natural-looking esthetic result.
About the Authors

Christy Savas, DDS
After completing his doctor of dental surgery degree in 1982 at Georgetown University in Washington, D.C., Dr. Christy Savas settled in Worcester with his wife, Donna. He opened a dental office in Worcester County and has served patients for more than 30 years. Because the health of your teeth and mouth play such an important role in your overall health, Dr. Savas is constantly involved in continuing education. Dr. Savas is a member of two local dental study clubs, including the Spear Education Club, led Dr. Frank Spear. He is also the former President of the Central Massachusetts Implant Dental Study Group.

Yuki Momma, RDT
Yuki Momma, RDT graduated from Yukioka Dental Technician School in Japan. In 2000, he joined Miyamoto Dental Clinic where he could have direct feedback on the restorations he made. While working at the clinic, he challenged himself by studying at Osaka Ceramic Training Center. Upon his completion at the training center, he moved to Boston and started working as a Master Ceramist at Gnathos Dental Studio in Weston, Massachusetts. He built his skillset as a ceramist for seven years and, in 2017, founded the Ceramic Artisan Dental Lab. Since he started his own laboratory, his focus has increasingly been on the publication of professional articles and lecturing. His articles have been published in DTG Magazine and Labline. He was also a speaker at the DTG Symposium 2018 and gives many lectures and courses.

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