New technologies have established themselves on the dental market, particularly for fabricating aesthetic restorations. With the introduction of the CAD/CAM technique, materials which were not available before, such as zirconium oxide, can now be used in the dental laboratory. Compared with all-ceramic systems that are already available on the market, this material can be used for a wider range of indications in fixed denture prosthetics. Therefore, it is now possible to fabricate long-span bridges. Restorations made from zirconium oxide have a decisive advantage due to their high stability. As both systems can be inserted using the conventional technique, these restorations represent a good alternative to metal-ceramics for dentists.

Indications

These new framework materials require a new generation of high-performance ceramics in order to maintain their advantage over metal-ceramics. The new IPS e.max Ceram layering ceramic from Ivoclar Vivadent is a nano-fluorapatite glass-ceramic with optical properties that are similar to those of the IPS d.SIGN metal-ceramic. It is part of a new all-ceramic system, which comprises two different types of glass-ceramic ingots. One type of ingot is used to fabricate pressed restorations, while the other is used to press onto zirconium oxide frameworks. Moreover, the system includes glass-ceramic and high-strength zirconium oxide blocks that are processed by means of the CAD/CAM technique. The integrated layering ceramic is suitable for veneering zirconium oxide frameworks and glass-ceramics alike. The material can also be used for fabricating veneers on refractory dies. Consequently, a variety of all-ceramic indications can be covered. The advantage of this system compared to metal-ceramics can be described very easily, as all advantages of light dynamics can be fully exploited.Opaque base materials have to be used to cover the dark oxides on metal frameworks. Light transmission, which is very important, is interrupted. The IPS e.max system enables virtually unlimited light transmission, which endows the restorations with an even more lifelike appearance. Hence, restorations that come very close to their natural counterparts can be fabricated (Fig. 1). The author would like to provide a closer look at this ceramic and show how reliable the material is to work with based on impressive images.

Liner

The zirconium oxide frameworks are cleaned under running water or with a steam jet (Fig. 2). The IPS e.max Ceram ZirLiner generates a sound bond between the ceramic and the framework. However, it is different from the liners of other systems, since it does not mask the framework like an opaquer but is applied in a thin layer and remains translucent even after firing (Fig. 3), similar to fired stains. This liner, in the present case the IPS e.max ZirLiner 1, is applied only once.

Fig. 1: Cross-section of a zirconium oxide crown by transmitted light.
After firing, a silky-matte glass is visible. The liner is available in different shades—based on the IPS e.max shade concept. In contrast to opaque-like liners that act as a light blocker, the IPS e.max Ceram ZirLiner supports light transmission in the cervical areas and thus improves the true-to-nature effect of zirconium oxide crowns.

Proven layering and shade system

After this step, IPS e.max Ceram is layered. As with all ceramic systems, it is advisable to build up the basic shape of the reconstruction with the respective Dentin shades (Fig. 4) in order to control the size and shape. In the present case, a mixture of Dentin A2-A3 is used. The incisal area is cut back down to the framework on the labial surface (Fig. 5) to gain information on the layer thickness. In addition, all the different layers, such as effects and translucencies are located within the crown. The framework is covered with Deep Dentin in A2 in order to prevent the coping from shining through in the incisal area. The reduced area is subsequently built up with the respective Dentin materials. This build-up serves as the basis for all further layering procedures. The incisal proximal aspects are reduced and a mameelon structure is designed. The incisal edge is built up with Opal Effect 1. Transpa Blue is used for the sides.

Effects are applied (Fig. 6). A bright band of Opal Effect 1, Transpa Clear and incisal materials 1 and 2, Transpa Incisal 1, and 3, Transpa Blue and Mamelon Light are used for internal characterization. Various effects will not show to advantage if applied too intensively, as the applied material is designed. The incisal edge is built up with Opal Effect 1 and 2, Transpa Clear and Transpa Incisal 1 (Fig. 7). The incisal edge is mixed with Incisal Edge and Mamelon Yellow-Orange. This material is used to lengthen the incisal area and to frame the incisal edge. Next, firing is conducted according to the instructions of the manufacturer. Once the contact points have been adjusted, the crowns are finished and their shape and function is checked. The missing areas are supplemented with Incisal 1 and 2 in a corrective firing. Thus, the shape is refined (Fig. 9).

Essence and Stains materials

After finishing the crowns and bridges, it is very important to check the shape and surface. For this purpose, I use silver powder, which blocks the shade and thus pushes the shape to the fore (Fig. 10). Once the surface and shape have been designed, glaze firing is conducted according to the manufacturer’s instructions. For characterization, 10 Essence materials and 7 Shade stains are available. The advantage of the Essence materials is that they feature the “1-for-3 effect”. These materials can be mixed with all the other IPS e.max Ceram powder materials or they are used for internal characterization or surface staining. Various characteristics can be applied, if required. In total, there is a variety of possibilities to design crowns individually. Finally, the restoration is mechanically polished and a glaze firing conducted (Fig. 11). The new layering ceramic is ideally suitable to imitate the natural play of light.

Conclusion

The new IPS e.max Ceram ceramic material is ideally suitable for veneering zirconium oxide frameworks. The material is easy to process. In addition, the material exhibits a life-like fluorescence and spaciality due to its specific composition (nano-fluorapatite). The restoration in situ fulfills everything we expect of a state-of-the-art ceramic (Fig. 12 and 15). I am sure that I have made the right decision to use this ceramic, as it allows me to produce true-to-nature restorations. 

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