Building up the perfect tooth with composite resins

The appearance of the upper anterior teeth in the preoperative situation was unsatisfactory. Tooth #11 looked particularly unattractive and neither its shape nor its shade met the standards of a high-quality dental restoration. In order to obtain a clearer understanding of the preoperative situation, a greyscale image was produced (Fig. 1), illustrating the insufficient brilliancy and lack of translucent areas.

In addition, surface structures and their various transitions, as well as wave-like white striations, were visible. From the incisal aspect, the vestibular contour looked distinctly uneven (Fig. 2). As a result, the right incisor leaned towards the labial aspect. The wing effect of the teeth in this particular case could therefore not be reconstructed. Consequently, tooth #11 looked out of place.

The shade system of IPS Empress Direct comprises various dentine shades with high opacity. They are suitable for achieving bright effects (Bleach L/XL) or providing complete coverage (IVA 5/A6). The system also includes matching enamel materials (Opalesc. 5/A6) or providing complete coverage (IVA 5/A6). The system also includes matching enamel materials with more translucent Bleach and Incisal shades, as well as shade components called Trans Opal (opalescent). A straightforward method was used for gaining a general impression of the shade layers of the neighbouring natural tooth. Various shade samples of IPS Empress Direct were applied to the untreated enamel surface of the adjacent tooth—in this case tooth #21—and polymerised (Fig. 3). Shade variations could be eliminated owing to the polymerisation process.

The prepared tooth was then illuminated from various angles with an operator’s light, which gave us a good idea of what the individual shades would look like in the mouth of the patient. The shade impressions obtained in this way provided us with valuable information regarding the shade behaviour of the composite resin system in use and the shades required for building up the restoration. In the present case, for example, the opalescent material Trans Opal was applied to the sides of the restoration in order to imitate the bluish-white areas of the adjacent natural tooth.

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Build-up and layering of the basic shape

After the old restoration had been removed from tooth #11, the first increments were placed (Fig. 4). In order to imitate the saturated and intensive shade (opacity) of the neighbouring tooth, dentine shade A3 was placed at the base of the restoration. In addition, dentine and enamel shades A2 were applied in the incisal area. A lighter shade was required in the cervical region and therefore layers of dentineshade A2 were applied. Enamel shade A2 was placed on the sides (distal, mesial) of the restoration in order to impart greater brightness to the tooth.

Figure 3 clearly shows the different layers (the shade designations have been projected onto the image). Owing to the dehydration of tooth #21, the shade had already changed compared with the samples shown in Figure 3, which was an important reminder of the fact that shade selection must be done very quickly, since the neighbouring tooth no longer provided a reliable shade reference once dehydrated. The built-up materials were covered with a coating of Flow A2 and the vestibular surfaces were created.

Tooth #11 was consequently built up according to the layering protocol described. The aim of this step was to imitate the shading of the neighbouring tooth and create the basic shape of the restoration (Fig. 6).

The incisal area of this roundish tooth shape, however, was difficult to recreate. The mesial edge was quite angular and only transitioned into the rounded body of the tooth towards the distal aspect. In this case, it was necessary to exaggerate the contours of this area where the composite was placed. This created ample scope for finishing the restoration. In all cases, the convex and concave areas had to be carefully finished, which is often difficult to accomplish in the first attempt.

The functional parameters were also considered in this process. This approach had shown to be very effective in routine practice work. If time resources are limited, for example, patients can be discharged with this type of preliminary solution. The final layering procedure takes place at a later stage. Before the patient leaves the practice, however, the surface of the build-up should be coated with a flowable product in order to give the patient a comfortable feeling in the mouth.

Customised shading

The restoration build-up was completed with different shades from the range of composite resin materials. Mamelon-like depressions were cut into the surface of the preliminarily shaped and shaded restoration with a finisher (red code, fine grit) using the cut-back technique (Figs. 7 & 8). The individual shade effects were created at these grooves at a later stage with the inlay.