# Achieving more with less

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## Introduction

"Less is more". However, using less is often difficult. In view of the high demand for minimally invasive restorations, dental technicians are presented with new challenges in many cases. The extent of the preparation is often reduced to minimize the invasiveness of the treatment, leaving only limited space for the fabrication of an esthetically pleasing, functional restoration. Such situations necessitate adequate ceramic materials and experience to reproduce the subtle interplay of shades seen in natural teeth. While previously various ceramic powders had to be combined with each other to create the required mixture, this procedure has now been simplified with the introduction of new ceramic materials. IPS e.max® Ceram Selection are specially shaded Enamel and Effect materials with brilliant shades and natural-looking light-optical properties. The range comprises twelve shades that are divided into three groups. The six Special Enamel shades are designed to produce lively translucent effects in the enamel area. The three Light Reflector Effect materials have light-reflecting capabilities and are suitable for areas where a high brightness value is desired.

The three Light Absorber materials with light-absorbing properties are used to increase the in-depth effect. With this variation in materials, imitating natural teeth with individual characteristics is much easier than before. The range of possibilities is particularly convenient in cases where space is limited, such as in very thin restorations (e.g. veneers).

In the case described, lab-fabricated non-prep veneers made it possible to sidestep orthodontic treatment in the clinical case presented in this report. Despite the limited space available, brilliant shade dynamics were achieved with the help of specially shaded Enamel and Effect materials (IPS e.max Ceram Selection).

## Clinical case

The approximately 40-year-old patient wanted the position of her teeth corrected (Fig. 1). She consulted her dentist with regard to this problem. She rejected orthodontic treatment because of the expected costs, the long treatment time and the limitations during therapy. An orthodontist had recommended the extraction of a tooth in the lower jaw to compensate for the crowding and to provide the basis for orthodontic treatment. All of this was out of question for the patient. She also emphasized that no tooth structure should be removed for the esthetic correction.

*Figure 1: Incisal view of the preoperative situation.*

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*Figure 2: Mock-up in wax placed on the model.*

*Figure 3: Selecting the basic tooth shade (Dragon Shade, Drachenberg & Bellmann).*

## Treatment plan and mock-up

The possibilities of an esthetic improvement in the upper jaw were discussed together. In particular, teeth 11 and 13 were responsible for the unevenness in the dental arch. The teeth were inclined from the axis towards the palatal. The idea was to use two ceramic non-prep veneers to correct the misalignment and achieve harmony in the dental arch. With the help of a study model, the ideal tooth position was established in wax (Fig. 2) and then converted into "fast and easy" resin veneers (mock-up). The first impression after the placement of the mock-up was positive. There was a strong aha! effect. The patient agreed to the treatment. The existing chalky spot on tooth 21 was masked with composite in the dental practice.

## Challenge: reproducing the shade of the natural tooth

The shape and morphology of the veneers were defined by the mock-up and now a matching tooth shade for the ceramic materials had to be determined. The challenges were posed by the dynamic interplay of shades, the "beautiful" translucency of the natural anterior teeth and the limited space available. How can the light-optical properties be reproduced as perfectly as possible in only a wafer-thin layer of ceramic material? The Enamel and Effect material concept of IPS e.max Ceram Selection provided the solution to this conundrum. First, the basic tooth shade was determined, for which shade samples mounted on a gingiva shield (Dragon Shade, Drachenberg & Bellmann, Germany) were used (Fig. 3). Conventional shade tabs - without gingival section – may impair the result.

During the selection of the basic tooth shade, it had become evident that standard dentin materials would not be sufficiently intensive to reproduce the natural tooth shade due to the thin layer thickness with which the veneer had to be created. It was therefore decided to use the Enamel and Effect materials of the IPS e.max Ceram Selection range. Self-made shade samples were used as reference for the targeted selection of the materials. Among others, the Light Reflector Effect material in shade cream should lead to the desired result (Fig. 4). In addition, three enamel shades were chosen.



*Figure 4 & 5: Selecting the IPS e.max Ceram Selection materials using shade tabs. On the right: shade tab with the intensive enamel shade "quartz"; on the left: shade tab with the light intensive Effect material "cream".*

*Figure 6: Master model with dies made of investment material.*

*Figure 7: Investment material dies are being soaked with water.*

*Figure 8: Building up the veneer for tooth 11 using IPS e.max Ceram Selection materials.*

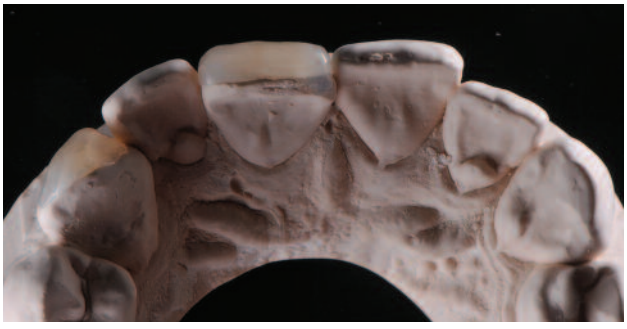

*Figure 9: Incisal view of the completed veneers on the model.*

The intensive enamel shade "aqua" was selected to emphasize the bluish translucent areas along the marginal ridges (Fig. 5). The enamel shade "apricot" should lend warmth to the incisal, enhance the translucency and heighten the chroma. In addition, the slightly greyish but still warm enamel shade "quartz" was chosen.

## Creating the veneers

Refractory dies for teeth 13 and 11 were created with the help of the master model (Fig. 6). The dies were then soaked in water to prevent them from drawing moisture from the ceramic materials during the layering procedure (Fig. 7). The veneers were built up in layers in accordance with the shape defined by the mock-up (Fig. 8). No dentin material was used. The colour-intensive Effect shade "cream" was used for the dentin core replacement. The other Effect shades selected served to bring out the warm-translucent interplay of shades. It did not take long to build up the veneers in ceramic. However, the esthetic appearance of a restoration is not determined by the shade effect alone. Subtle, barely noticeable surface structures can underline the natural appearance of a restoration. Adequate time and attention was therefore dedicated to designing the surface morphology of the veneers. At the final firing, the ceramic surfaces were slightly smoothed and, once fired, refined by mechanical polishing. Polishing was carried out carefully by hand. Figure 9 shows that the teeth were successfully brought into alignment with the adjacent teeth to create a harmonious appearance. An initial evaluation in the dental lab showed that the veneers demonstrated a natural interplay of shades in spite of the thin material thickness (Fig. 10). However, the effect in the mouth will ultimately decide the success of the restoration.

## Seating the restoration and final result

An essential aspect for the success of veneers is the cementation procedure. No matter how brilliant the ceramic materials are and how skilful the work of the dental technician is, if the shade of the adhesive cementation material is not chosen correctly, the joy of the "new smile" will be short lived. Variolink® II luting composite in shade neutral was used for incorporating the veneers. Prior to placing the veneers, they were tried in with try-in paste to confirm that the treatment goal had been achieved. Once the ceramic veneers and tooth surfaces were conditioned (Fig. 11), the veneers were bonded to the teeth. The result

*Figure 10a: Veneer 11 features an insertion handle at the incisal edge to be removed by grinding once the restoration is seated.*

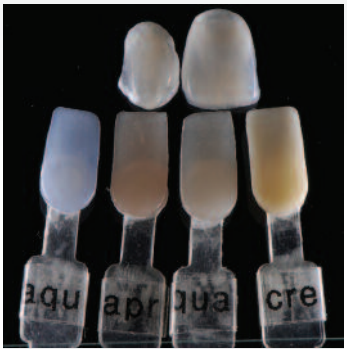


*Figure 10b: Despite their thin layer thickness, the veneers exhibit natural light-optical properties.*

was impressive. Teeth 13 and 11 now blended in harmoniously with the rest of the dental arch (Fig. 2). The tooth shape was aligned with the shape of the adjacent teeth, while slightly asymmetrical contours supported the natural appearance of the restorations. The light-optical properties of the veneers left nothing to desire. The intrinsic interplay of shades and variations of translucency seen in the adjacent teeth were faithfully reproduced. After the functional criteria had been checked, the patient was discharged from the practice (Figs 13 and 14).

## Conclusion

In principle, such challenges can only be met if the dental technician understands the light-optical properties of natural teeth and is able to use appropriate ceramic materials. The procedure demonstrated in this report eliminated the need for dental technicians to mix the individual materials themselves. Suitable materials in the ideal shade could be applied "directly from the tub". In this way, the balancing act between maximum esthetics and minimum invasiveness was successfully and reliably accomplished.

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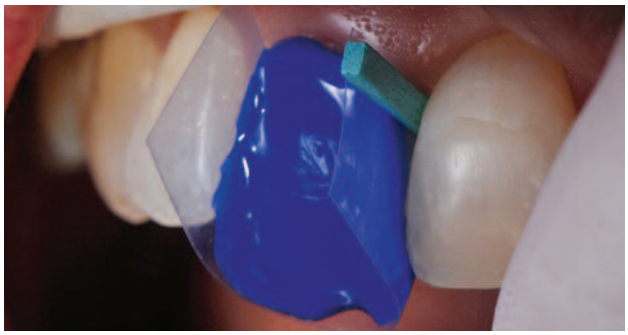

*Figure 11: Conditioning of tooth 11 for the adhesive cementation procedure.*

*Figure 12: Situation after seating the veneers on teeth 11 and 13.*



*Figure 13 & 14: Final check of the functional aspects. The veneers blend in with the dental arch naturally and "invisibly".*