Make good use of what you have
Fabrication of ultrathin veneers for invisible, non-invasive restorative dental treatment

Fig. 1: Portrait photograph of the patient before the treatment.
Fig. 2: Pre-op situation: the close-up view shows the aesthetic shortcomings of the teeth.
Fig. 3: Dentition after the careful removal of the old composite restorations.
Fig. 4 & 5: The wax-up was crafted with an opaque wax.
Fig. 6: Trial run with the mock-up after surgical crown lengthening.
Fig. 7: Working model for the fabrication of the veneers on teeth #15–25.

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A systematic approach is essential when the aim is to achieve the best possible aesthetic results in tight situations. Apart from the tooth morphology, the parameters of brightness, opacity and translucency have to be taken into account.

A radiant smile suggests a positive attitude and plays an important role in human interaction. When a person’s smile is changed, this influences the way in which the person is perceived by others. In order to change a patient’s smile in a way that will be attractive and effective, a wax-up and/or mock-up should be used to determine the treatment goal at the outset. This approach also allows as much tooth structure as possible to be preserved. Once a favourable basis has been established, the permanent restoration can be created, without any significant preparation in some cases.

A wax-up is an indispensable aid in diagnosing and analysing the individual restorative needs of the patient, since it reflects the actual conditions. Furthermore, the cementation protocol must be established at the beginning of the treatment, so that the wax-up can be used to anticipate and avoid any possible problems.

In the following case, a young actress wished to have the composite restorations on teeth #11 and 21 replaced with a long-lasting aesthetic solution. In addition, the patient was dissatisfied with the dark appearance of her central incisors (Figs. 1 & 2). The aim of the treatment was to apply non-invasive principles and use only very little restorative material to achieve an outstanding result.

First, the teeth were internally whitened. Next, the old composite restorations were carefully removed with the help of finishing discs. The tooth surfaces remained virtually untouched in the process (Fig. 3). A special modelling wax was used to create the wax-up, since the space requirements were very restricted. Owing to conventional waxes demonstrating very low opacity, we decided to use the highly opaque material Cx5 (ABI), which is also used for sculpturing purposes. This material exactly suited our needs (Figs. 4 & 5). The shape, morphology and microtexture of the final restoration were crafted in wax and then submitted to the attending dentist.

The wax try-in was checked in the dental office and a few minor modifications were made. We decided to give the patient a full smile design treatment that would involve teeth #15–25. For this purpose, the crowns were surgically lengthened according to a state-of-the-art protocol. After the healing phase, an impression was taken without the soft tissue having to be retracted (Fig. 6).

In the next step, the waxed-up veneers were converted into ceramic using a hot-pressing process (IPS e.max Press, Ivoclar Vivadent). For this purpose, the restoration margins were carefully marked with a red pen on the study model (Fig. 7). The markings were made on the labial surface approximately 0.5 mm from the gingival margin. For the fabrication of the veneers, we looked for a material that would offer the highest possible level of brightness (value). Furthermore,
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the material would have to be able to simulate the translucent properties of natural tooth structure.

The IPS e.max Press Value ingots exhibited the luminosity required in this case, and they would allow the desired translucent properties to be achieved in the incisal areas (Figs. 8–10). As mentioned, the waxed-up restorations were reproduced in ceramic (Value 2 ingot) using the familiar press technique. The pressed veneers were approximately 0.3 mm thick. Consequently, they were somewhat bulky in the marginal area in particular. As a result, these areas would have to be adjusted with silicon carbide burs after the restorations were placed.

The plan was to characterise the veneers with a layering ceramic. Therefore, they had to be cut back slightly. The ultrathin veneers were ground with utmost precision, since subsequent remeasuring is not recommended and can lead to flawed results. We cut back the restorations according to the markings we had made (Fig. 11). These horizontal and vertical lines had been drawn on the contact surfaces of the restorations. Owing to the high translucency of the ceramic, these lines were visible on the labial surfaces and served as a guide for the removal of the restorative material (Figs. 12 & 13). The finished cut-back areas showed that very little space was available for the characterisations (Figs. 14 & 15). Only the incisal and central areas were individualised as a result (Figs. 16 & 17). The veneers were finished and sent to the dental practice. Since the restorations were ultrathin, final polishing would be done in the patient’s mouth.

The restorations were permanently seated using products in the Variolink Veneer Cementation Kit (Ivoclar Vivadent), which were used according to the instructions of the manufacturer. The restorations were seated and the transitions to the dental hard tissue were carefully finished with silicon carbide burs to attain the desired surface gloss (Fig. 18). The veneers looked very natural in the mouth. The ceramic restorations were indiscernible from the tooth structure (Figs. 19–21).

**Conclusion**

Non-invasive veneers offer many advantages, including maximum preservation of the tooth structure. In this case, we were able to satisfy yet another patient with an aesthetic restoration without having to remove any healthy tooth structure.