Non-invasive superior restoration with HeraCeram Saphir: How to achieve a lot with little.

Odt. Master Björn Maier

How is it possible to satisfy a patient's desire to align poorly positioned maxillary anteriors without orthodontics and without preparation? In this article the author shows how he achieved this with no-prep veneers.

The prerequisite is the use of a high-strength layering ceramic that ensures longevity despite the minimum thicknesses of the layers. And if ceramics like HeraCeram Saphir used in this article have optical-luminous properties that mimic those of natural teeth, then nothing stands in the way of invisible integration.

Fig. 1 — Thanks to their fine grain, HeraCeram Saphir restorations have a high degree of homogeneity. This means that even the thinnest structures are not a problem.

Fig. 2 — The patient was not satisfied with the aesthetics of her otherwise healthy upper front teeth.

Fig. 3 — To improve the situation, no-prep veneers in HeraCeram Saphir were planned. The aim was to correct the position of the teeth without having to sacrifice healthy tooth structure. A wax-up was used to plan a possible work process.

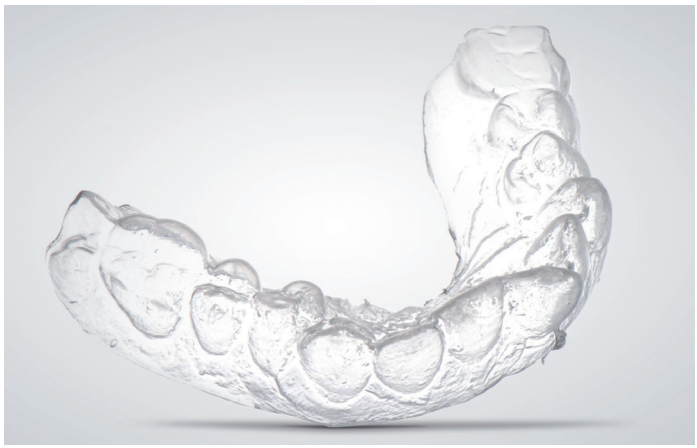

Fig. 4 — The wax-up was blocked with a 0.5 mm thick transparent resin transfer plate (thermoforming plate)

Fig. 5 — The mock-up that was created with the wax-up was transferred into the patient's mouth with the transfer plaque and the situation was evaluated in situ

Fig. 6 — The photos/videos help to better evaluate the effect of the mock-up and to show the patient the aesthetic added value of the restoration

The execution of veneers for non-invasive restorative concepts requires a stratification ceramic that has high strength and photo-optic properties identical to the natural ones. Kulzer's HeraCeram Saphir offers a new ceramic veneer ideal for these indications.

In addition to the detailed realization of no-prep veneers using HeraCeram Saphir ceramics, this article will also cover aesthetic planning. Thanks to the natural properties of the stratification material, it is possible to obtain the necessary optical effects even in cases of very small spaces. The perfect opalescence of HeraCeram Saphir allows the user to compensate for the very different thicknesses of the layers, without running the risk that the ceramics will eventually have a gray hue.

The fine-grained nature of HeraCeram Saphir stratification materials is such that ceramics almost never contract during baking and that the restorations have a very high degree of homogeneity. Since HeraCeram Saphir is a high-strength metal-ceramic, it is possible to design even the thinnest structures (Fig. 1).

The patient in the case described below was not satisfied with the appearance of her maxillary anterior teeth. (Fig. 2). As her teeth were healthy, I suggested no-prep veneers using HeraCeram Saphir to improve aesthetics. The goal was to guarantee the patient a better quality of life without having to prepare her teeth.

To generate a first impression of the aesthetic possibilities, a wax-up model was fabricated (Fig. 3), which was blocked with a transfer plate of 0.5 mm (Fig. 4).

This plate was used to quickly and easily duplicate the anterior sextant directly in the oral cavity of the patient for evaluation (Fig. 5). With the help of video-analysis of the proposed treatment, before and after imaging was captured for half of the Mock-up (Fig. 6) demonstrating that the patient could achieve excellent added aesthetic value.

With a temporary white resin, the wax-up was transferred to the surfaces of previously isolated teeth with a minimum amount of petroleum jelly. Trying the mock-up in the mouth confirmed that most of her rotated teeth could be corrected with no-prep veneers. The patient was insistent on non-invasive treatment. Second, in the author's experience, refractory stumps are best

Fig. 7 — For veneers, a model with removable stumps is required. For this purpose, the plaster stumps are duplicated in refractory material, and these are then repositioned on the model

Fig. 8 — The new HeraCeram Saphir ceramic is ideal for thin veneers. Its fine-grained structure ensures results with high stability and homogeneity

Figs. 9 & 10 — After degassing, the refractory abutments are carefully wetted to seal them. HeraCeram Saphir clear is suitable for this purpose since it has the lowest melting point due to the lack of color pigments and therefore seals the surface well

Fig. 11 — It is important that the layered ceramic does not contact the fracture support or adjacent die. The use of absorbent cotton is not recommended as it draws heat away from the dies and leads to too low a firing temperature.

suited for execution of veneers, some of which are very thin. This requires a template with removable stumps (Geller model) meaning that plaster stumps are duplicated in refractory mass and then repositioned on the model (Fig. 7). The new HeraCeram Saphir ceramic is ideal for this type of restoration (Fig. 8). Thanks to its fine-grain structure, very stable and homogeneous results can be obtained. Both criteria are extremely important for this type of restoration.

After the degassing firing, the refractory stumps are thoroughly wetted (Fig. 9). Then the washbrand is carried out. HeraCeram Saphir clear is the most suitable material for this purpose since its melting point is lower due to the absence of metal coloring oxides and therefore has a glaze effect on the surface of the stumps with minimal thickness. In figure 10 it is visible how HeraCeram Saphir clear is applied in a very thin and uniform layer on wet refractory stumps.

For firing, the stumps can be placed on a refractory support honeycomb or, as in this case, on a normal refractory support for bridges and crowns (Fig. 11). It is important that stratified ceramics do not contact the refractory support or the adjacent stump. The use of absorbent cotton is not recommended as it reduces heat from the stumps and leads to baking at too low temperatures. Stratification was performed according to the Triple Layering Technique, (TLT), the author's favorite. This reproducible stratification technique has also proved to be very suitable for the execution of veneers. Stratification is divided into four parts: the reconstruction of the basic hue, the brightness gradient, the individualization, and the light filter (Fig. 12).

The new manufacturing process of HeraCeram Saphir ensures a very fine and homogeneous particle size distribution, which makes the masses creamy and easy to use even during mixing. (Fig. 13). This property ensures better stability during stratification and guarantees a very homogeneous baking with low contraction.

The base hue and brightness gradient are the first step of the Triple Layering Technique stratification. Especially in the case of non-invasive restorations. In the case of reconstructions with space minimal, it becomes evident how an aesthetic and reproducible result can be obtained with the help of the described stratification technique. This first layer

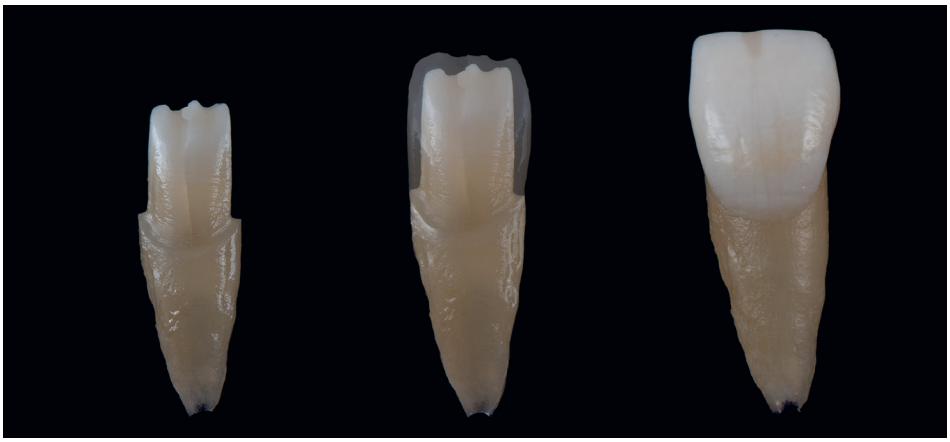

Fig. 12 — The author promotes the so-called Triple Layering Technique (TLT) in which the stratification is divided into reconstruction of the base color and the brightness gradient, as well as in the application of light characteristics and filters

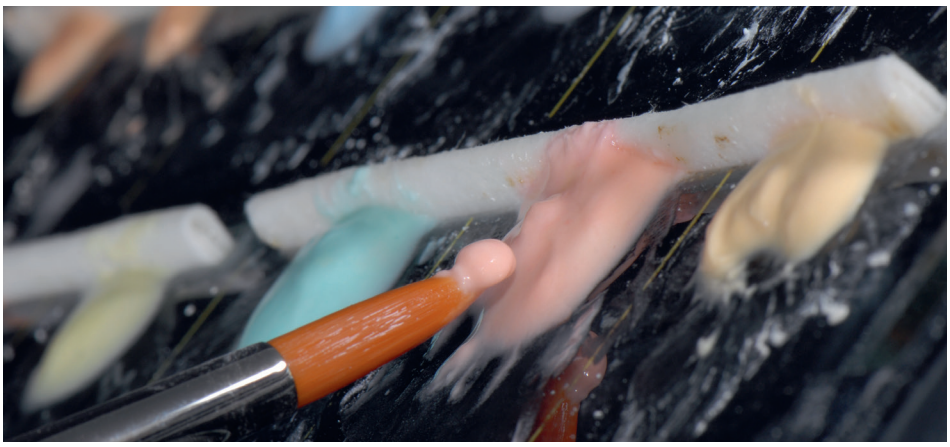

Fig. 13 — The new production process of HeraCeram Saphir guarantees a very fine and homogeneous particle size distribution which in turn makes the materials easy to handle. The consistency of the layering ceramic is already evident during mixing on the plate

Fig. 14 — The Triple Layering Technique begins with the application of the basic hue and brightness gradient. This technique is particularly beneficial for non-invasive restorations where space is limited. The first layer compensates for the different volumes of the structures

Fig. 15 — Due to the sometimes very high difference in volume, it makes sense to bake the first layer. A uniform basic structure is thus achieved for further stratification

compensates for the different volumes of the veneers and creates a uniform basis for further characterization (Fig. 14). Because of the sometimes very large volume difference, it makes sense to bake the first layer. In this way, a uniform base structure is achieved for further layering. (Fig. 15).

Due to the natural optical dynamics of the dentin of HeraCeram Saphir, a harmonious interaction between the natural tooth body and the reconstructed dentin is achieved. Incisal opal materials from the assortment were used for the incisal area. In the second step, the individual features were layered onto the previously created base structure (Fig. 16). Using the TLT, all vertical and horizontal structures specific to the patient's age could be placed in the correct position. The mass assortment provides the user with a user-friendly selection of effect masses. The distinctive subdivision makes it easier for the user to understand the properties of individual masses and to use them correctly. By mixing the masses together, even the finest color structures can be precisely imitated. To individualize the layering, the most intensely colored masses can be used to mimic decalcifications, mamelon structures, mamelon extensions, and secondary dentin. Transparent masses can be used to reconstruct opalescent and transparent areas (Fig. 17). With the application of the final light filter, the morphology of the crowns is completed, and the color and brightness of the restorations are adjusted (Fig. 18). Transparent materials such as OT1, OTA, OTY or OTG are used for this purpose. With the Enhancer materials in the system, the user has a complete system of light filters to control the shade value and brightness. Finally, the materials are baked and the interproximal contacts and restoration shapes are finished. With the second dentine firing, any missing volumes can be supplemented with transparent materials. After the detailed morphology has been completed, the surface structure corresponding to the age of the patient is elaborated and the veneers are finished with a final glaze baking (Figs 19 and 20). After the final check

Fig. 16 — In the second phase the characteristics are applied individually on the previously created basic structure, and all vertical and horizontal structures specific to the patient's age can be placed in the correct position

Fig. 17 — To accentuate the veneers, masses of more intense color can be used to imitate decalcifications, mamelon structures, mamelon extensions and secondary dentin. More transparent masses can be used to reconstruct opalescent and transparency.

Fig. 18 — The third and final step of the TLT is the application of the final light filter. With it the morphology of the crowns is completed, and the hue and brightness of the restorations is fine-tuned, for example, with OT1, OTA, OTY or OTG.

Figs. 19-20 — After baking, the interproximal contacts and the restorations are finished. The second firing of the dentin is used to supplement any missing portions with transparent masses. Finally, the surface structures corresponding to the patient's age are processed and the veneers are finished with a glazing firing.

Fig. 21 — After checking the contact points and function, the refractory material was carefully removed using polishing sand at a pressure of 1.5 bar. You can see how the thicknesses of the layers are extremely different

Fig. 22 — With the help of no-prep veneers, the patient was offered a pleasant restoration concept so that the bad positioning of the teeth could be corrected without preparations or orthodontic treatment.

of the function and contact points, the refractory material can be removed with polishing sand at a pressure of 1.5 bar. The demands placed on the layering ceramic in this case become very clear when looking at the sandblasted veneers (Fig. 21). The layer thicknesses are extremely different. Especially in the case of no-prep veneers, it is important to ensure that the transitions on the natural tooth surface are slightly serrated to create a smooth transition between the natural tooth and the veneer.

Cementation and conclusion

The veneers were cemented by the dentist using a flowable composite. The excess was removed after pre-polymerization, and the transitions were finished and polished after the final light-curing. The exceptional physical properties of the of the newly developed layering ceramic concept made it possible to restore, in a simple and reproducible manner, a not-so-common patient case. With the help of the no-prep veneers, the patient was offered a pleasing restoration that restored the natural structure of the tooth without any preparations of the structure of the tooth and compensated for the mal-positioning of the teeth, which the patient considered an aesthetic defect. (Fig. 22). SDI

About the Author

Dr. Björn Maier apprenticed as an industrial mechanic from 1992 to 1995, specializing in CNC technology and precision mechanics and then trained as a dental technician in his parents' laboratory until 1999. Next, he moved to Arizona, USA, where he completed a three-month internship at Mitch Unrath Dental Laboratory. Following this, he attended the University Dental Clinic in Ulm, Germany. He relocated to Switzerland where he worked until 2006 in two laboratories – one which specialized in implantology and CAD/CAM. Björn Maier was ranked 4th in the Candulor KunstZahnWerk competition in 2003. He can boast of numerous publications at home and abroad and has successfully participated in the 3M Espe Talent Award. In 2007, he passed the dental master's exam at the Master's school in Stuttgart. In the spring of 2007 he opened his own dental laboratory "Zahntechnik Björn Maier". He is co-author of the books "Anterior Restoration" and "CAD/CAM Technology". From January 2010 to December 2011, he worked in the dental laboratories of the Dental Prosthesis Polyclinic of the Ludwig-Maximilian University of Munich, Germany with a focus on CAD/CAM. Björn Maier is co-author of the book "Zähne und Prothesenkunstoffe" (Teeth and Plastic Prosthetics).