Chairside CAD/CAM immediate restorations

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Introduction
No-preparation ultrathin veneer is one of the most minimally invasive restorations. Its thickness ranges from 0.3 to 0.5 mm. In the right circumstances (Figs. 1 & 2) it can show excellent aesthetic appearance, and provide long-term stability and health of soft- and hard-tissue.

The overall structure of ultrathin veneer is flexible, in that its neck can gradually change from thick to thin, and the border can be knife-edge or thin round-convex (Figs. 3 & 4).

Manufacturing inlays, onlays, crowns and veneers chairside with a CAD/CAM system has become established in most dental offices. This technique can produce immediate scan, design, milling and restoration quickly and conveniently. It is the same for the no-preparation ultrathin veneer. For chairside CAD/CAM systems, CEREC is the most developed system.

The biocompatibility of CEREC is widely used for restoration design, has target contours such as wax up. In this mode, the operator should scan the original teeth shape in the mouth or on the model first, then wax up and re-scan the wax-up shape into the CEREC system. Both optic impressions will transfer into the virtual model, and match to each other to obtain the restoration contour information. Depending on the 3D data, chairside milling can be complete in few minutes. Post-milling processes usually contain shaping and polishing. In some conditions, it may be necessary for additional staining and glazing.

Case report
A 72-year-old female patient presented, whose dentition had apparent discoloration. The treatment plan was accept- ed, and the patient was prepared for the ulcerative no-preparation veneer margin (Figs. 5 & 6).

It was found that due to the abrasion which had occurred over several decades, the labial surface was plane and flat, the incisors had been worn to a straight line and also had abrasion-associated defects (Figs. 7 & 8). The no-preparation veneer that would occupy the “outer space” of the teeth would eliminate the slight wrinkles around the lips. These effects were part of the patient’s expectations and the treatment plan was accepted.

Taking the treatment requirement and oral condition into consideration, the patient was prepared for the ultrathin no-preparation veneer. Digital Smile Design (DSD) was done based on the pre-operation photos (Figs. 9 & 10), and the patient was satisfied with the aesthetic appearance of the design.

The patient wanted her teeth colour to seem natural and to disguise the discoloration. The treatment plan was confirmed as CEREC designed and manufactured Maxill II (VITA) veneer of 0.3 mm thickness, A1 shade, and the material was chosen for its excellent aesthetic performance and translucency.

The manufacture of no-preparation veneer could depend on the precise gingival margin of pre-operation. This step

Conclusin
To sum up, the “bulk-fill technique” using Tetric EvoFlow Bulk Fill and Tetric EvoCeram Bulk Fill allows us to be more efficient with almost no compromises compared to the conventional layering technique. The C-factor is no longer an issue due to the shrinkage stress relievers. As expected, marginal gaps do not occur more frequently and are not larger compared to the conventional layering technique. Application is clearly quicker and the aesthetic effect is in most cases similar to that of conventional laminar composites. The differences in the translucency of materials for conventional posterior composite restorations are no longer of relevance due to the Aesthetic Dentistry. This sets a new standard in this group of composite.

Fig. 1: No-preparation veneer is adapted to the teeth with flat surface.

Fig. 2: When the teeth have apparent curvature, no-preparation veneers may have weak contact areas. Micro-preparation veneers is more appropriate.

Fig. 3: Ideal gradual thinning no-preparation veneer.

Fig. 4: Acceptable round convex no-preparation veneer margin with a little thickness.

Fig. 5: Frontal view pre-operation.

Fig. 6: Frontal smile view pre-operation.

Fig. 7: Upper-anterior dentition view pre-operation.

Fig. 8: Upper pre view pre-operation.

Fig. 9: DSD dentition view pre-operation.

Fig. 10: DSD smile view pre-operation.
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Fig. 11: Precise pre-operation model.

Fig. 12: Pre-operation scan.

Fig. 13: Wax-up based on pre-operation model.

Fig. 14: Biocopy model.

Fig. 15: Biocopy optic model accurately match with pre-operation model.

Fig. 16: Setting the insertion direction and margin of the restoration.

Fig. 17: Finished restoration design.

Fig. 18: Designed restoration prepared to mill.

Fig. 19: Ready veneers before cementation.

Fig. 20: The thickness of the finished restoration is 0.3 mm.

Fig. 21: Try-in: frontal view of upper anterior dentition.

Fig. 22: Try-in: incisal view of upper anterior dentition.

Fig. 23: Try-in: lateral view of smile.

Fig. 24: Try-in: lateral view of smile.

Fig. 25: Four-year follow-up: frontal view of upper anterior dentition.

Fig. 26: Four-year follow-up: frontal view of smile.

Fig. 27: Four-year follow-up: lateral view of upper anterior dentition.

Fig. 28: Four-year follow-up: lateral view of smile.

Fig. 29: Four-year follow-up: lateral view of smile.

Fig. 30: Four-year follow-up: lateral view of smile.

Fig. 31: Four-year follow-up: frontal view of face.

Fig. 32: Four-year follow-up: lateral view of face.
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could save the patient’s chairside waiting time; the biocopy technique can simplify the design process, milling the restoration with a 0.5 mm original thickness and polishing after milling will decrease the risk of milling defects.

The exact process can be concluded as:

1. Obtain a precise pre-op impression, and make the model. Use a CEREC scan to obtain information about the abutment teeth (Figs. 11 & 12).
2. Depending on the DSD result, make a wax-up on the pre-op model. The thickness of wax-up should be made a wax-up on the pre-op model.
3. Setting the margin of the abutment teeth, the marginal edge line is not fixed because of the no pre-preservation technique. The direction of insertion should be defined first, which can cover most areas of the labial surface, incisor edge and adjacent surfaces. The border of the covered area should be the margin of the restoration (Fig. 16).
4. Shape formation of the restoration. Copy the target shape of the biocopy model, the restoration should be calculated automatically. If there is any defect, it can be adjusted and corrected by the tools. If there are any areas not thick enough for 0.5 mm, it should be added to 0.5 mm to avoid fractures during the milling process (Figs. 17 & 18).
5. Modification and polishing of the initial restoration to 0.5 mm thick after milling. And fine polishing of the final restoration (Figs. 19 & 20).
6. Intracor try-in, fine adjustment and cementation (Figs. 21–24).
7. Four-year follow-up and recheck. The restorations are as excellent as before and the margins are tightly sealed, the colour is stable, there is no margin colorized or whole colour changing. The patient is very satisfied with the aesthetic performance and function. A charming smile appearance has given her more confidence and vigour (Figs. 25–32).

Conclusions

The no-preparation veneer is a kind of restoration with high precision requirement and manufactured difficulty. It is usually finished in laboratory. Getting benefit from chairside CAD/CAM techniques, immediate restorations are in one appointment. It can be achieved; dentists can invite the patients to observe the process of restoration design and manufacture, and even get involved into the design. Patients may feel that they are participating in the treatment establishing an emotional connection with the restoration, which may also make them more easily accept and love their restoration. The value of increasing the satisfaction should not be ignored.

Biocopy design is the combination of traditional aesthetic design and digital virtual design. It is also the most consistent and fast technique nowadays. Digital virtual technique is becoming more and more established. Using 3D techniques directly to make a virtual design may also get wonderful restoration performance; it can be predicted that this pattern will become the mainstream of digital aesthetic design in future.

Restoring function and aesthetics with monolithic zirconia restorations

By Dr Ara Nazarian, US

With greater public awareness about cosmetic dental reconstructions, the dentist is often challenged with greater demands from the patient. This increased demand for aesthetic restorative treatment challenges the dentist, laboratory technician and dental manufacturer to develop techniques and materials to satisfy the discerning patient. Utilising digital characterization and can therefore be length-to-width ratio and create a less worn appearance.

As a result of the information gathered from the diagnostic wax-up, it was determined that aesthetics and function could be enhanced by restoring the entire dentition. The final treatment plan would consist of crown restorations, placing composite cores where needed from teeth #17–27 in the upper arch and teeth #27–46 in the lower arch.

The material of choice for these crown restorations would be Zenostar (Wieland/Ivoclar Vivadent). According to the manufacturer, this translucent zirconia material com-bines excellent flexural strength with the aesthetics of natural tooth shades.

With full-contour Zenostar restorations, there are two methods of achieving the desired shade: the Zenostar brush-infiltration technique or the Zenostar staining technique. Six pre-shaded zirconia blanks—matte, light, medium, intense, sun and sun chroma—form the basis for reproducing the patient’s natural dentition. Owing to their warm, reddish hue, Zenostar Zr Translucents and sun chroma are suitable for crowns in the upper arch and for restorations with individual colour characterisation and can therefore be used for patients whose own natural dentition deviates from the classical tooth shades.

Planning

After reviewing the clinical findings and the mounted models, the patient was diagnosed with a restricted envelope of function and decreased vertical dimension from continuous wear. In order to develop a treatment plan and determine whether the vertical dimension could be increased, a diagnostic 3D White Wax-Up (Ar-rowhead Dental Laboratory) was fabricated (Fig. 4).

In the wax-up, the vertical dimension was increased by 1.5 mm. Also, based on information gathered from the initial consultation and digital images, it was determined that the maxillary central incisors could be lengthened by 1.5 mm to improve the aesthetics. The canines would also be lengthened to restore canine guidance in lateral excursions. Regarding the mandibular anterior teeth, the goal was to correct the excessive wear. In order to develop a treatment plan and determine whether the vertical dimension could be increased, a diagnostic 3D White Wax-Up (Arrowhead Dental Laboratory) was fabricated (Fig. 4).