Chairside CAD/CAM immediate restorations

Anterior no-preparation ultrathin veneers

**By Drs Feng Liu & Xing Liu, China**

**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 (Fig. 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-like 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 virtually impossible to detect the discolouration under the restoration. It is usually possible to detect the margins from the occlusal and frontal view (Fig. 5). The X-rays show the excellent radiopaque properties of both materials, i.e. the flowable and sculptable variant (Fig. 9a and b).

**Case report**

A 72-year-old female patient presented, whose dentition had apparent curvature and abrasion-related defects (Figs. 7 & 8). 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.

**Conclusion**

The patient wanted her teeth colour to seem natural and to disguise the discolouration. The treatment plan was confirmed as CEREC designed and manufactured Mark II (VITA) veneer of 0.3 mm thickness, A1 shade, and the material was chosen for its excellent aesthetic performance and translucency. The material of no-preparation veneer could depend on the precise wax-up of pre-operation. This step...

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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: initial 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 upper anterior dentition.

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 defect.

The exact process can be concluded as:

1. Obtain a precise pre-operation 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 from 0.3 mm to 0.5 mm. Get the biocopy scan of the wax-up model, and match accurately with the pre-op model (Figs. 13-15).

3. Setting the margin of the abutment teeth, the marginal edge line is not fixed because of the no preparation 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 tool. If there are any areas not thin enough for 0.3 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 0.3 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 colored 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. 25-29).

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 in one appointment can be achieved, dentists can invite the patients to observe the process of restoration design and manufacturing, 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 classical aesthetic design and digital virtual design. It is also the most consistent and fast technique nowadays. 3-D virtual technique is becoming more and more established. Using 3-D 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.

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 manufacturers to develop techniques and materials to satisfy the discerning patient. Utilising digital planning, modern materials and effective techniques, the restorative team can succeed in restoring a patient’s dentition.

Case presentation

A woman in her early forties was referred to my practice by her dental provider because she was dissatisfied with the appearance of her smile. The patient explained that she felt that her existing teeth and restorations were unattractive because of recurrent caries, wear and colour (Fig. 1). Most importantly, she mentioned that she was suffering from tension headaches, grinding and a limited range of function.

Initial diagnostic evaluation at the first appointment consisted of a series of digital images with study casts, a centric relation bite record, a facebow transfer and a fullmouth set of radiographs. In the maxillary arch, the patient had several teeth with worn composite and veneer restorations, as well as abrasions with cervical caries. In the lower arch, several existing composite restorations had worn and exhibited caries on the facial cervical areas. Although there were no restorations present in the mandibular anterior teeth, there was severe wear of the incisal edges, possibly due to grinding and other parafunction.

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 C.O 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 recreate canine guidance in lateral excursions. Regarding the mandibular anterior teeth, the goal was to correct the smile to proper form, function and health. The case presented in this article demonstrates the significance of a systematic approach to planning, preparation and material selection in full-mouth reconstruction of a patient’s dentition.

Preparation

Once informed consent had been obtained from the patient, treatment was initiated. After anaesthetic was administered, the existing veneers and crown restorations were removed and the teeth cored with composite if there was any indication of recurrent caries remaining in the respective tooth.

Adhes Universal bonding agent (Ivoclar Vivadent) was applied following the manufacturer’s protocol and cured using the Bisphosphonate LED curing light (Ivoclar Vivadent). Using MultiCore Flow Light (Ivoclar Vivadent), build-ups were accomplished on the teeth that required cores. A Clear Reduction Guide (Arrowhead Dental Laboratory) pro-