

Full-mouth adhesive rehabilitation: the “add not to remove philosophy”

Francesca Vailati, Geneva, Switzerland

The number of young patients affected by severe dental erosion is growing constantly and it is the task of the dentist to find ways of restoring these teeth in an appropriate procedure. The traditional prosthodontic approach involving the placement of several crowns is highly invasive and implicates the destruction of large parts of healthy tooth structure. While I have adopted this approach as a prosthodontist for many years, I have completely changed my concept of restoring teeth: I started to use alternative techniques based on adhesive dentistry, since I believe that we do more damage to the teeth with our dental instruments than caries or dental erosion is able to do in many years. I call this new attitude the “add not to remove philosophy”.

Procedure

A minimally-invasive preparation of eroded teeth is one of the most important factors especially in case of severe loss of tooth structure, where a full-mouth rehabilitation is often necessary. One way to keep tooth preparation to a minimum is to plan the full-mouth rehabilitation at an increased vertical dimension of occlusion (VDO). Using the three-step technique, several rehabilitations have already been achieved with a very successful outcome. Generally, the posterior quadrants are restored first at an increased VDO, creating an anterior open bite. This space allows restoring the palatal aspect of the maxillary anterior teeth, which are often very compromised in case of dental erosion, without any tooth preparation (only sealing of the dentin) by means of palatal veneers.

For this procedure, composite resin restorations are excellently suited for both the posterior and the anterior teeth. In case the facial aspect of the maxillary anterior teeth is also affected by tooth destruction, facial veneers are implemented. The combination of a palatal and a facial veneer to restore a single anterior tooth is called the sandwich approach.

Novel material

Until now, the material of choice for this approach has been composite combined with glass ceramic for the facial veneers, since composite seems to be kinder, i.e. less abrasive than ceramics in the mouth. However, the new resin nano ceramic block developed by 3M ESPE seems to combine the positive properties of composites and ceramics. And as it is CAD/CAM machinable, restorations of higher quality may be expected. In the following patient case, it will be illustrated how 3M™ ESPE™ Lava™ Ultimate CAD/CAM Restorative is used for full mouth rehabilitation.

Patient case

A 37-year-old patient presented in the dental practice suffering from severe dental erosion. The patient was classified ACE Class IV (affected by severe dental erosion), since – due to destruction of the incisal edges – the clinical crowns were more than two millimeters shorter than usual, but the facial enamel was still preserved (Fig. 1). At the palatal aspect of all maxillary teeth, conspicuous loss of tooth structure was apparent (Figs. 2 and 3).



Figure 1: Initial situation. The maxillary central incisors are supererupted.



Figure 2: Loss of natural tooth structure is more severe in the maxillary arch, especially at the cervical palatal level.



Figure 3: Close-up view of one of the posterior quadrants. Despite the major tooth destruction, all these teeth, except for one first molar, were still vital.

A treatment plan was developed in agreement with the patient that included the placement of posterior onlays in the first step. Afterwards, the palatal aspect of the maxillary anterior teeth was to be restored using palatal veneers. Finally, the treatment was planned to be completed with four facial ceramic veneers (sandwich approach) at the level of the maxillary incisors. The goal of the treatment was to restore the lost tooth structure

without any tooth preparation (except for removal of caries).

Production of the posterior onlays

The patient was scheduled for two appointments for caries removal and immediate sealing of the exposed dentin. No additional tooth preparation was executed for the fabrication of the posterior onlays. An impression was taken and sent to the dental laboratory for model production. The models were mounted in maximum intercuspation position (MIP) and the VDO was arbitrarily increased to create sufficient space for the palatal onlays and the veneers, so that no tooth preparation was necessary. In the laboratory, the onlays were designed in a computer-aided procedure and milled afterwards with the CEREC MC XL milling machine (Sirona Dental Systems), using the Lava Ultimate blocks. On the model, the onlays showed a precise fit. After minor adjustments, they were simply individualized with shades and polished (Figs. 4 and 5).

Subsequently, the six onlays were tried in and bonded one at a time under rubber dam (Figs. 6 to 8). At the same time, direct resin composite



Figure 4: The finished onlays on the model.



Figure 5: Detailed view of three onlays with individualizations. Each restoration was kept monolithic to preserve the maximum strength of the Lava Ultimate material.



Figure 6: In the first phase, six onlays were placed at the same time at an increased VDO in the maxillary arch.



Figure 7: Close up of the final restorations in situ.

restorations were created in the mandibular arch. For this purpose, transparent keys were utilized and the three step technique was followed. Minimal adjustments were necessary to achieve a stable occlusion on the posterior quadrants. At

the end of this treatment phase (increase of the VDO and creation of an anterior open bite), the patient was very comfortable.

Fabrication of the anterior palatal veneers

After one week the patient was scheduled for another appointment. The posterior occlusal contacts were checked and the exposed dentin on the palatal aspect of the maxillary anterior teeth was immediately sealed without any additional tooth preparation. Subsequently, an impression of the maxillary arch was taken. Based on the obtained information, six palatal veneers were designed and milled from Lava Ultimate CAD/CAM blocks (Fig. 8). The restorations were removed from the block and fitted as well as finished on the model (Figs. 9 and 10).

After three days, the six palatal veneers were bonded using the same protocol as for the posterior onlays (Fig. 11). The patient was satisfied with the result, although the treatment was not completed, yet. As



Figure 8: 3M™ ESPE™ Lava™ Ultimate CAD/CAM Restorative for CEREC.



Figure 9: Comparison between the palatal veneers and the original anterior dentition. The palatal veneers restored not only the palatal aspect, but also the incisal edge of the maxillary anterior teeth.



Figure 10: Six polished restorations. It was decided not to close the existing diastemas with the palatal veneers. Eventually, the interproximal contact points would have been obtained by means of the facial veneers, after checking the aesthetic outcome with a facial mock-up.



Figure 11: The six veneers and six onlays cemented in the patient's mouth.

had been planned in the beginning, the maxillary anterior teeth needed to be restored with facial ceramic veneers using the sandwich approach. However, the patient had to leave for several months and – due to a lack of time – the final treatment was postponed. Nevertheless, the aesthetic outcome was already very pleasing for the patient (Fig. 12).

Conclusion

The present case shows that the new CAD/CAM material can be used effectively in full-mouth rehabilitations, leading to satisfying results in terms of function. With wear properties similar to composites despite higher stability and aesthetics close to that of ceramic materials, Lava Ultimate is a promising new development for my specific purposes – complex restoration procedures with minimal to any additional destruction of natural tooth structure.



Figure 12: Follow-up the day after the bonding of the six palatal veneers. The patient was very satisfied with the preliminary result, even though at a close view a small white line was still visible on the left central incisor.