Direct composite restoration in a complex patient case—A valuable alternative

Fig. 1: Initial situation after completion of periodontal treatment. — Fig. 2: View from the palatal side: the carious lesions and defective restorations are clearly discernible.— Fig. 3: Removal of various tooth structure.— Fig. 4: Bevelling of preparation margins.

Prof. Abelardo Baez Rosales, Dr Ramon Schlierer Gacciutolo & Dr Manuel Gajardo Guineo

Aim:

Conventional restorative methods help preserve as much healthy tooth structure as possible and slow down the destructive restorative cycle. Nonetheless, direct restorative treatment may offer a valuable alternative, even if it may not be the first choice. Direct composite restorations are particularly useful for patients who are looking for an inexpensive treatment option. Modern direct restorative materials facilitate minimally invasive prepara-

Fig. 5: Selective etching of tooth structure: the etching gel was allowed to react with the enamel for 30 seconds.— Fig. 6: Palatal layer of Tetric N-Ceram Bleach L. At this point, a fibre-reinforced post had already been inserted into the root canal of tooth #11.— Fig. 7: The dentine core was reconstructed with Tetric N-Ceram A1.5 Dentin.— Fig. 8: The proximal areas were built up after a thin metal matrix had been applied and secured in the interproximal area.

Fig. 9: Application of Tetric Color whit.— Fig. 10: Finishing with Astropol.— Fig. 11: High-gloss polishing with Astrobrush.— Fig. 12: Final result.

Direct restorative treatment is particularly suited to the re-

Fig. 13: Final result. construction of anterior teeth in cases in which there is sub-

stantial loss of tooth structure. However, appropriate treatment planning and a systematic appli-

Fig. 14: Final result. cation of the adhesive technique, particularly if anterior guidance has to be re-established, are prerequisite for achieving a suc-

Fig. 15: Final result. cessful result. This report de-

Fig. 16: Final result. scribes the reconstruction of anterior teeth that were severely damaged by dental caries. The treatment involved the use of a fibre-reinforced root-canal post and a build-up restoration with Tetric N-Ceram (nano-

Fig. 17: Final result. optimised composite material; Ivoclar Vivadent). The restora-

Fig. 18: Final result. tions were customised with Tetric Color (Ivoclar Vivadent).

The patient was referred to us by his periodontologist to have his upper maxillary teeth reconstructed. The teeth in question showed substantial loss of tooth structure due to multiple medium-sized to large carious lesions and frac-

Fig. 19: Final result. tures of the existing restorations (Figs. 1 & 2). Upon completion of periodontal treatment, tooth #11 was treated endodontically. Subsequently, the planning stage was commenced. For this pur-

Fig. 20: Final result. pose, a diagnostic wax-up was created for teeth #12, 11, 21 and 22. This wax pattern fulfilled two functions: it allowed evaluation of the function and morphology of the planned restoration and fabrication of a silicone key, which the dental team used as a guide during the composite build-up.

At the first session, the teeth were first treated prophylacti-

Fig. 21: Final result. cally to remove extrinsic stain-

Fig. 22: Final result. ing. After that, the carious dentine was excavated with a round carbide bur at slow speed (Fig. 3). A completely dry treat-

Fig. 23: Final result. ment field was established with a rubber dam to ensure appro-

Fig. 24: Final result. priate adhesive bonding. The enamel margins were bevelled to enhance the adhesion of the restoration (Fig. 4). This marginal design also created a gentle transition between the natural tooth structure and the restoration.

Next, the fibre-reinforced post was inserted and cemented into the root canal of tooth #11 to compensate for the extensive loss of tooth structure and enable the subsequent placement of the restorative material. Surplus cement was carefully removed from the root-canal entrance. Next, the enamel and dentine were etched with phosphoric acid (enamel for 30 seconds and dentine for 15 seconds; Fig. 5). Then, the adhesive was applied to the substrate, which was still moist, and polymerised until the surface showed an even, glossy appearance. This indicated that the prepared surfaces and den-

Fig. 25: Final result. tine tubules had been sealed reliably.

After application of the adhe-

Fig. 26: Final result. sive, the palatal walls were first built up using Tetric N-Ceram Bleach L (Fig. 6). For this pur-

Fig. 27: Final result. pose, the silicone key, which was produced based on the wax-up, was employed. In the incisal area in particular, the layer thick-

Fig. 28: Final result. nesses should be kept to a mini-

Fig. 29: Final result. mum to ensure sufficient space for the subsequent application of the effect materials. A curing time of 10 seconds with a blue-

Fig. 30: Final result. phase light unit (> 1,200 mW/cm²) is sufficient, owing to the thin thickness of the layers. The dentine core was built up with Tetric N-Ceram A3.5 Dentin.

The mamelons were only slightly accentuated to match the age-

Fig. 31: Final result. specific characteristics of the patient (Fig. 7). It is important to note that layers exceeding 2 mm are not applied at any stage. Furthermore, each layer should be light-cured for 20 seconds using a light output of at least 500 mW/cm². Short curing times of 10 sec-

Fig. 32: Final result. onds are sufficient with light units that provide an output of > 1,200 mW/cm². The composite may be adapted with a brush to avoid entrapment of air bubbles. A thin metal matrix was applied and secured with a wooden wedge to create optimal contact areas (Fig. 8). The aesthetic de-

Fig. 33: Final result. sign may be optimised with char-

Fig. 34: Final result. acterisation materials to meet the individual requirements of the patient (Tetric Color white was used in the present case; Fig. 9). Next, a thin layer of Tetric N-Ceram Bleach L was applied to establish an ideal outline of the mamelons and ideal light reflection angles. Flexible discs and abrasive silicone polishers were used for finishing the restoration.

Final polishing of the restora-

Fig. 35: Final result. tion was performed during a sec-

Fig. 36: Final result. ond appointment. The Astropol silicone polishing system and Astrobrush polishing brushes (both Ivoclar Vivadent) were utilised (Figs. 10 & 11). These auxiliaries ensure both an op-

Fig. 37: Final result. timal surface gloss and a fine surface texture (Fig. 12).

Conclusion

As patients’ expectations of dental aesthetics are continuing to rise substantially, restoring anterior teeth constitutes a veri-

Fig. 38: Final result. table challenge. Although the direct restorative technique does not necessarily present the method of choice for large recon-

Fig. 39: Final result.structions in the anterior region, as indirect restorations tend to be preferred for this indication, it may nonetheless offer a viable alternative for patients who can-

Fig. 40: Final result. not afford, or do not want to pay, the cost of more expensive treat-

Fig. 41: Final result. ment.

Acknowledgement

We would like to thank Dr Carla Franco V, who was responsi-

Fig. 42: Final result. ble for the periodontal treat-

Fig. 43: Final result. ment and therefore contributed substantially to the successful outcome of this patient case. We also highly appreciate her con-

Fig. 44: Final result. tinued academic support.  

Contact Info

Prof. Abelardo Baez Rosales is the Director of the Dental School at the University of Vila del Mar in Chile. He can be contacted at abelardobao@gmail.com.