Aesthetic rehabilitation and tissue preservation in the anterior region

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While there are often several adequate prosthetic treatment options to choose from for one single case, there are some cases where none of the proven solutions seems to be perfectly suitable. The prosthodontist and his team have to balance the pros and cons for each available option – they have to decide which treatment is best suited to fulfill the needs of the specific patient. This was the case with a 16-year-old female patient who presented at the Department of Prosthodontics of the Ludwig Maximilians University of Munich, Germany in 2015. An orthodontic treatment had just been completed and a further prosthetic rehabilitation was required.

Background

At the age of 10, the patient had suffered an anterior tooth trauma with avulsion and replantation of the maxillary central incisors (teeth 11 and 21, FDI notation). Despite all efforts, it had not been possible to preserve tooth 21. The former dentist had replaced it with a four-unit metal-ceramic adhesive bridge (Marbyland) (Figs. 1 & 2).

Unfortunately, the diastema prognosis for tooth 11 was confirmed in the course of treatment. It had to be extracted during orthodontic therapy. In order to replace both central incisors for the duration of this therapy, a provisional bridge with artificial gingiva was manufactured and attached to the fixed incisive appliances (Fig. 3).

Prosthetic treatment plant

At the patient’s first visit in the private dental office of the LMU Munich, the lateral incisors had large composite restorations not only on the vestibular surfaces, but also on the incisal surfaces. After crown modelling, contact points and occlusal contact points satisfaction, we went to the next step - Manufacture (Milling process). Once the milling was over, we polished the tooth and sat it on the preparation. After checking the points of contact and occlusion, the crown could be cemented. Cemntation was done by Varilink by tboolc due to its great cemenatation shade/opacity control and adhesive attrib-utes.

Result

The colour of the crown seems to be darker after cementation. Lighter shade of the neighbouring teeth is caused by loss of moistness during the length of the procedure (Fig. 9). We asked the patient to come in several hours or the next morning to check the colour. She called only to say everything is perfect and she is very satisfied with this restoration. We have to rely on her judgment and believe that the colour really is satisfying.

Conclusion

This clinical example demonstrates, that if we have sufficient knowledge of latent dental trends and suitable equipment, we can help the patient in one session, even in more complicated cases that would otherwise require multiple appointments. MyCrown allowed to create a perfectly fitting restoration within one visit. The initial software proposal of the crown design was approved allowing to place the restoration into the patient mouth within minutes of its completion.

We should always consider every patient is different and should be treated with a unique approach, based on the indication. MyCrown illustrated the benefit of being able to offer restorative treatment in a single visit.

Laboratory procedure

In the dental laboratory, the digital impression file was downloaded, a physical model ordered and the data set imported into the Ziko CAD-Software for the design of the adhesive bridge framework.

The bridge was designed in full contour. The recommended parameters (minimum wall thickness, connector strength etc.) for the selected material (Zirkonzahn) were entered into the software. Then, the bridge was automatically reduced to the framework (Fig. 6).

This procedure is beneficial in that it provides for a uniform strength and optimal support of the veneering porcelain. The framework was milled, thinned out at the margins using a fine diamond rubber polisher, individualized with dyeing liquids, and sintered. The precise fit of the wings to the palatal tooth surfaces was confirmed on the model before the porcelain layering was performed (Fig. 7). Figure 8 shows the situation at the biscuit bake try-in.

Finally, the adhesive bridge was finished and glazed. On the model, a highly accurate fit was obtained (Fig. 9), and the restoration showed a natural appearance (Fig. 10). This is in part due to the high translucency of the framework material (Fig. 11).
Clinical procedure

With the use of a GC Fit Checker Advanced Blue (GC Europe), the precise fit observed on the model was confirmed intraorally (Fig. 12).

As the patient was also satisfied with the aesthetic result, the adhesive bridge could be placed immediately. For this purpose, the working field was isolated with rubber dam and a 37% phosphoric acid etching gel applied to the palatal enamel surfaces of both lateral incisors for 30 seconds and to the dentine surfaces for 15 seconds before being rinsed off. The inner surfaces of the wings were conditioned to increase the surface roughness. After thorough cleaning of the surfaces, an adhesive (3M Scotchbond Universal Adhesive) was applied, rubbed in, air-dried and light-cured according to the manufacturer’s instructions. Then, 3M RelyX Ultimate Adhesive Resin Cement was applied and the bridge placed. The excess cement was removed immediately with a sponge pellet.

To prevent a reaction of the uncured cement with oxygen and lay the foundation for a good marginal integrity, the exposed margins were covered with glycerine gel (Fig. 13). figures 14 shows the situation immediately after curing.

Figures 15 and 16 show the results 8 weeks after the restorative procedure. Due to the material selection in the present case, it is not necessary to remove the restoration as long as it serves its purpose. Thus, the planned long-term temporary might even become a definitive restoration over time. This, of course, is only possible with continuous monitoring and good compliance of the patient.

Result

The aesthetic appearance was already satisfactory, although the harmony was impaired by black triangles between the teeth. Due to the favourable characteristics of the ceramic, however, the soft tissue coverage was achieved easily and closed the gaps. The former, however, is regarded as functionally less effective and not capable of supporting the preservation of soft and hard tissues. The two-unit adhesive bridges would have required stabilisation with a retainer.

Discussion

As an alternative to the selected treatment option, it would have been possible to place a removable partial denture or two two-unit adhesive bridges with one wing each. The former, however, is regarded as functionally less effective and not capable of supporting the preservation of soft and hard tissues. The two-unit adhesive bridges would have required stabilisation with a retainer. The main reason to opt against this alternative was the compromised value of the abutment tooth 22. As the root surfaces of the maxillary lateral incisors are small, it also seems questionable if this design would have offered sufficient stability to ensure the desired result.

With regard to the restoration that was produced, the invasive preparation is surely a matter of debate. However, the existing preparation for the metal-ceramic bridge and the large composite restorations limited the amount of sound tooth structure that needed to be sacrificed at this point of the treatment to a minimum, so that the plan became acceptable. In general, the maximum preservation of tooth structure should always be given highest priority when a dental restoration is planned. Important criteria guiding the amount of hard tissue removal are the available intermaxillary space and the minimum wall thickness of the selected material.

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