

Aesthetic restoration of posterior dentition

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Introduction

It is not always easy to restore the natural appearance of posterior teeth with direct filling techniques. In the restoration of damaged proximal surfaces, matrices and wedges have to be used to recreate the contacts, contours and curves of the interdental anatomy as well as the special features of the marginal ridges. One of the greatest challenges in restorative procedures is the creation of suitable proximal contact points: This applies not only to their dimensions, but also to their three-dimensional position, both vestibulolingual and occluso-cervical. We have found a way of producing reliable results quickly and easily with Tetric EvoCeram® in a semi-direct procedure.

One of the main advantages of using the semi-direct technique in the fabrication of posterior dental restorations is that we can offer the patient cemented restorations at a lower cost than laboratory-fabricated inlays.

This solution is particularly interesting for young patients whose teeth show a suitable anatomy and the following problems: a large number of proximal caries, which have also affected the neighbouring teeth, or large restorations, which need to be replaced or are creating certain technical difficulties. In these cases, the extra-oral fabrication of the restoration enables the work piece to be built up and contoured more faithfully and the contact point to be reconstructed more accurately. The difficulty of creating a tight contact with composite materials is a wellknown problem of direct restorative procedures. If the operator uses matrices that are not preformed and wedges that are unsuitable in size, difficulties can arise in mastering demanding situations.

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Figure 1: Pre-operative situation.



Figure 2: Cavity preparation.

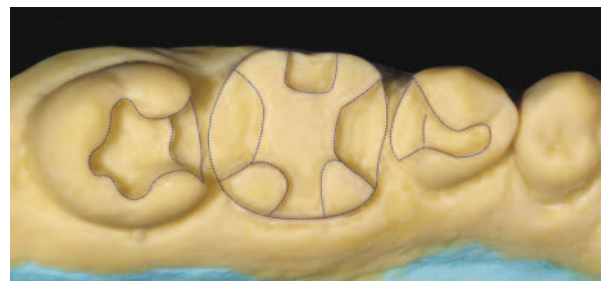


Figure 3: Working model made of addition silicone with high final hardness.

Because of these often frustrating and unsatisfactory results, we have introduced this semi-direct technique using nano-technology-based materials of the latest generation in our clinic. The materials used in this technique offer the added benefit of reducing the

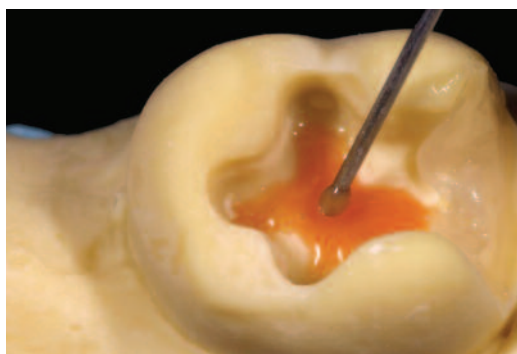


Figure 4: Application of the shade on the cavity floor to increase the final colour saturation of the pits.

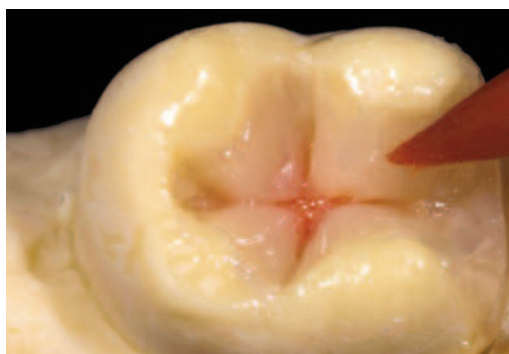


Figure 5: Application of Tetric EvoCeram Shade A2



Figure 6: Build-up of the cusps in tooth 46.



Figure 7: Final polishing with Astrobrush.

shrinkage stress associated with direct techniques. Furthermore, they show improved adaptation and marginal integrity in the long term.

Clinical case

A young patient presented to the practice and asked us to improve the appearance of his lower right molars (Figure 1). The amalgam fillings were more than ten years old and exhibited marginal leakage as well as corrosion. In addition, we discovered distal caries in the second premolar. We suggested restoring tooth 46 with a semidirect procedure in which we would fabricate an overlay to protect the fragile walls of this molar.

Once we had explained the procedure in detail, the patient consented to this approach. The shade of the teeth and their occlusal function was examined. Next, the amalgam fillings and the caries in the premolar were removed.

In cases such as these, it is important to adjust the former amalgam cavity to the requirements of the adhesive

cementation technique. That is, the cavity walls should diverge at an angle of 10 to 15 degrees and the margins should be well-defined, without chamfers or bevels. Because of the weak enamel walls and very limited dentin support in tooth 46, we decided to reduce the walls in order to achieve an onlay effect. The distribution of stress was improved by shifting the margins to the vestibular and lingual walls, which are less susceptible to marginal wear. The remaining walls of tooth 47 and 45 showed more support and were therefore not reduced (Figure 2).

For the fabrication of the working model we used a fast-setting precision addition silicone with high final hardness instead of conventional plaster. This allowed us to separate the restorative material from the model quickly and easily (Figure 3). As the composition of the silicone is similar to that of the material with which the impression is usually taken, it is important to use a different product for this step. This prevents the model from adhering to the impression. In this case, we used a polyether for impression-taking. In situations where retention is lacking



Figure 8: Final view of the restoration on the working model.



Figure 9: Application of Excite DSC adhesive on the restorations.



Figure 10: Cementation of the restorations with Variolink II.



Figure 11: The result.



Figure 12: Inspection of the brightness. The restorations are fully integrated.

or the interdental spaces are very narrow, we also use alginate.

Our working technique does not differ substantially from the direct technique. While the patient sat in the waiting room, we built up the restoration according to the principles of the direct technique (see Reflect 03/07) with a few differences. For example, we did not have to use matrices and wedges. Furthermore, we could not use the neighbouring teeth as an accurate reference for the anatomical situation when we applied the materials (Figures 4 to 6). A counter model would have provided us with more information, but was not absolutely necessary

in this type of situation. Extra-orally made restorations are characterized by enhanced aesthetics and highly accurate anatomical features. These outstanding results are due to the precision build-up of the materials and the careful creation of the contact points, which can be checked at every stage of the procedure.

After we had built up and polymerized the different materials, we removed overhanging margins with fine diamonds and finished the restorations. Subsequently, we polished the restorations with silicone rubber polishers (Astropol®) and brushes (Astrobrush®) at low speed (Figure 7). We used brushes to carry out the final work on

the interocclusal areas of the posterior restorations. Within the bounds of possibility, we avoided doing any aggressive finishing and polishing of the pits and fissures, in order to maintain the primarily and secondarily created anatomy (Figure 8).

Prior to cementation, the semi-direct restorations were light-cured in a special light furnace (Lumamat® 100) to increase the conversion rate of the resin and ensure its dimensional stability. A rubber dam was placed before the restorations were cemented. After acid etching for 30 seconds (Total Etch), a dual-curing adhesive (ExcITE® DSC) was applied to the prepared teeth as well as the indirect restorations (Figure 9), without polymerization. In addition, a dual-curing luting composite (Variolink® II) was applied. Next, any cement excess was removed with a brush. Dental floss was used to ensure that the contacts were free from composite. Subsequently, each restoration surface was polymerized for 20 seconds (bluephase® 16i).

When the restoration was permanently placed, it was important to critically assess the ability of the complex made up of Tetric EvoCeram and Variolink to mimic the natural situation (Figure 10).

Conclusion

Compared with direct filling methods, the semi-direct technique has the following advantages: The location and size of the contacts are more predictable and the occlusal anatomy is improved. The principles on which the described technique is based are the same as those of conventional composite restorative methods. Materials that are based on nano-technology, for example, Tetric EvoCeram, make this technique accessible to all dentists who would like to achieve outstanding mimetic results with reasonable effort (Figures 11 and 12).

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