

Semi-permanent restoration in anterior tooth region rehabilitation – planning and implementation

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Introduction

Semi-permanent restorations restore the form and function of prepared abutment teeth. Restorations of this kind are primarily aimed at protecting the prepared tooth substance from toxic and thermal influences, securing both occlusal and proximal contacts and ensuring the esthetic rehabilitation of patients. Furthermore, semi-permanent restorations provide the conditions for eliminating inflammation in the region of the marginal gingiva. In terms of esthetics, a temporary dental prosthesis enables a reliable prior evaluation of the future clinical outcome for the patient and the dentist. Any necessary modifications can be visually implemented immediately and be directly incorporated in the final dental prosthesis.

Case report

A 56-year-old patient presented herself to the Dental Prosthetics and Dental Technology Department of the University of Witten/Herdecke, expressing distinct dissatisfaction with her existing anterior esthetics. This was immediately confirmed in the course of the dental consultation when a prominent restoration became visible in region 21 despite relaxed lip tonus. This situation in the anterior region intensified with subtle smiling, leaving the restoration of tooth 21 further exposed and very prominent centrally. The overview scans and the detailed image of the maxilla illustrate the difficulties posed by this initial situation (Fig. 1). The extreme protrusion and central visibility of the crown on abutment tooth 21 required a detailed esthetic anterior tooth analysis. It should be noted that both central incisors of the upper jaw exhibited a correct W/L ratio of approx. 83% upon measurement of the tooth width. Chiche [1] indicates the existence of unsightly proportions for central upper incisors at values of >85%. The visible prominence of crown restoration 21 originated in the approx. 1.6 mm visual difference in tooth width between both upper incisors, measured labially. Tooth 11 has a very thin appearance because this tooth is tilted distally. These obvious esthetic imbalances are intensified by the buccal appearance of crown 21.

In the special medical history the patient indicated that the metal-ceramic crown on abutment tooth 21 was approx. 30 years old. In this inadequate restoration with a mismatched color, a dark bluish grey discoloration was visible in the region of the marginal gingiva. A root filing and metal post were discovered on the x-ray. After creating diagnostic casts the patient was informed and then pre-prosthetic orthodontic procedures as well as potential treatment options discussed. In agreement with the patient a decision was made to restore tooth 21 with a full-ceramic crown. As part of a diagnostic wax-up, the form and position of crown 21 was altered using esthetic wax, taking into account functional and esthetic parameters (Fig. 2). Even as early as this phase the patient was able to get an impression of the future prosthetic restoration and influence the final outcome. In order to achieve a plannable outcome, a drawn-down template was created as a means of producing a semi-permanent restoration. The crown on tooth 21 was carefully sectioned using a diamond bur on the ceramic veneer and a crown cutter protecting the marginal gingiva (Fig. 3). After removing the crown, a core build-up and metallic post became apparent. The insertion of a new light-cured composite restoration served as a pre-requisite for the preparation of tooth 21, which was carried out using a circular preparation margin design with a chamfer as a demarcation line (Fig. 4 and 5). A silicone key was used to check that enough buccal substance had been removed. Once the shade was determined (A2), the template was filled (Fig. 6) – avoiding air bubbles – with LuxaCrown (DMG) and positioned in the patient's mouth (Fig. 7) in order to produce the semi-permanent restoration for tooth 21. After a setting time in the mouth of approx. 2 min, the restoration remained on the tooth (Fig. 8) once the drawn-down template was removed. The oxygen inhibition layer was removed with alcohol. The restoration underwent finishing with a cross-cut bur in the crown margin and proximal



Fig. 1: Inadequate metal-ceramic crown on tooth 21, labial view.



Fig. 2: Wax-up of tooth 21 on the diagnostic cast.



Fig. 3: Sectioning the ceramic veneer through to the crown framework.



Fig. 4: Chamfer preparation of tooth 21, with a circular preparation margin de-sign.



Fig. 5: Preparation of tooth 21, maintaining a correct preparation geometry.

area approx. 5 min after the start of mixing. During the initial try-in (Fig. 9), the restoration was marginally altered in terms of form in the length of the incisal edge and the interincisal angle. Following a final polish of the semi-permanent restoration using a polishing brush, luting took place with a temporary luting material (Fig. 10). During the rehabilitation phase, great importance is placed on the semi-permanent restoration for the pre-evaluation of the clinical outcome. The success of the finished restoration is a significant basis for the final success and implementation of the final restoration.

Conclusion

In this rehabilitation in the anterior region, the clinical outcome was pre-evaluated with the help of a semi-permanent restoration LuxaCrown, something which was of crucial importance to the patient and the dental team and which played a key part in the success of the final restoration. The modifications developed in the semi-permanent restoration were directly implemented in the fabrication of the final full-ceramic crown. The proportional balance between the visible width of the central incisors played a vital part in the harmonious esthetic result achieved upon placement of the crown onto abutment tooth 21. Intensive cooperation and open communication between the dentist, patient and dental technician formed the basis for the success of this treatment.

Bibliography

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Fig. 6: Bubble-free filling of the drawn-down template with LuxaCrown.



Fig. 7: Intraoral positioning of the template filled with LuxaCrown.



Fig. 8: Semi-permanent restoration remaining on the prepared tooth immediately after removal of the template.



Fig. 9: Initial try-in of the semi-permanent restoration after marginal shape correction.



Fig. 10: Final fixed semi-permanent LuxaCrown restoration.