Esthetic Enhancement with Bilayered Temporary Bridges using Bis-acryl resin Material

Autor: Dr. Olivier Etienne, DDS, PhD, Assistant Professor in Prosthodontics, University of Strasbourg (UdS), France

Introduction

Circumstances that require significant prosthetic dental restoration occur less often nowadays, thanks to the progress in dental implantology. Even so, in some situations, they remain the only solution available for a functional and esthetically satisfying result. The clinical treatment scheme of these complete reconstructions requires a series of clinical steps and waiting times that are often long. In this context, the objectives of the temporary restorations do not differ much from those of the future permanent restoration. In fact, except for their temporary nature, they must offer all the functions of a tooth, and these functions may be classified into three categories: mechanical, biological and esthetic. As far as esthetics is concerned, the natural appearance of a prepared tooth may be satisfactorily concealed by the temporary tooth that imitates and maintains the essential properties of the tooth and the surrounding gingival tissue in terms of size, position, shape, color, surface properties and translucence. They also provide the practitioner with a valuable aid in refining occlusal and functional parameters before the prosthetic treatment is completed[1, 2]. Temporary restorations bear the advantage of having the patient directly involved in his own treatment, since he is able to confirm neuromuscular comfort, chewing ability, elocution and esthetic integration.

Numerous techniques, either direct ,in the dentist's chair, or indirect ,in the dental laboratory, have been proposed for these temporary restorations[3-6]. Depending on the timing and progress of the treatment plan, several generations of temporary bridges are usually necessary. To that end, the choice of the temporary material is a key component of the overall success[7, 8]. Composite resin materials are indicated as they generate less exothermic heat during polymerization compared to acrylic resin ones[9] and offer a satisfactory surface quality and a longterm color stability[10-12]. The direct technique proposed in this article is based on the use of the initial prosthetic design and of the well-known "cut-back" technique. It enables the practitioner to quickly obtain, and to copy as many times as necessary, a temporary full-arch bridge that has the required functional characteristics as well as an improved esthetic result.

Clinical case

A young patient, 28 years of age, consulted our office with a legitimate esthetic and functional request concerning his upper jaw dental arch (Fig. 1). Several teeth are missing (14, 24, 25) and the two lateral incisors (12, 22) are particularly destroyed. The remaining teeth have cavities and/or prior restorations of varying quality. In order to develop a treatment plan, the study models made from baseline impressions were mounted in an articulator. The preliminary mock-up developed by the dental technician meets the requirements for the desired fixed prosthetic restoration design (Fig. 2). The implant option was not selected after the patient refused the surgeries for bone grafting, outside and inside the sinuses, which were made necessary by the significant bone loss in the areas of the missing teeth. After this, accounting for the position of the various remaining teeth on the dental arch, a fixed prosthetic restoration consisting of two lateral bridges and 2 crown units for 21 and 22 was chosen.

The model prepared with the prosthetic design (wax-up) was duplicated twice in plaster. No particular correction was made to the first model (#1, Fig. 3), whereas the second model (#2) was sculpted in the laboratory according to the "cut-back" technique (elimination of the estimated enamel layer) (Fig. 4). This subtractive sculpture was limited to the vestibular

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Fig. 1: Initial clinical situation: numerous caries and various fillings are observed on the maxillary arch.

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Fig. 2: A diagnostic wax-up is build-up with functional and esthetic considerations.

sides of teeth 14 to 24. The two models were then reproduced using silicone impression material of complementary viscosity (high and low) in order to cover all details as closely as possible (Fig. 5, 6).

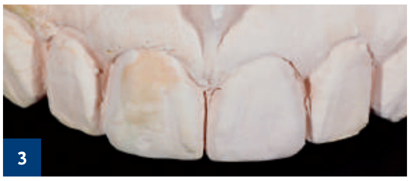
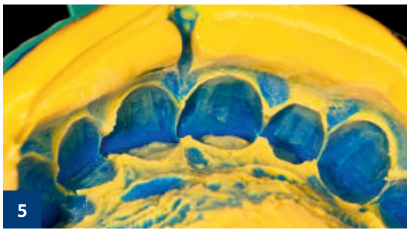


Fig. 3 and 4: The diagnostic wax-up is duplicated twice to obtain two similar plaster models (#1 & #2). The model #1 is let as it is (Fig. 3), whereas the model #2 (Fig. 4) is modified following the cut-back technique (removal of the enamel layer).



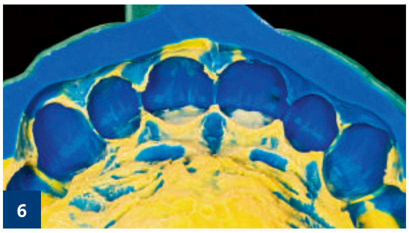


Fig. 5 and 6: Two different impressions were obtained: respectively impression #1 from the model #1 and impression #2 from the model #2. These impressions should be kept until the treatment plan has been completed in case a new temporary bridge needs to be produced.

These two sets of models should be kept throughout the period of the treatment plan and can be re-used as often as necessary.

During the first preparation session, the temporary esthetic bridge is produced. First, impression #2 is filled with Luxatemp Star resin (color A3) then repositioned in the patient's mount in order to determine the base tooth color (Fig. 7).

After removal of the impression, the "fatty" layer on the surface, corresponding to the oxygen inhibition layer, must not in any case be removed by manual contact. Impression #1 is then filled with the same resin, but of a more luminous color (here, A1), then inserted into the mouth over the first bridge (Fig. 8). After the polymerization of this enamel layer is complete, the silicone impression is withdrawn and the surface of the resin is wiped with a cotton ball that has been soaked in alcohol.

Fig. 7 and 8: Luxatemp Star (Shade A3) was injected into Impression #2 and placed over the prepared teeth. The first stage (Fig. 7) of the esthetic temporary bridge was obtained after this impression was removed (Cut-back stage). The oxygen inhibition layer must not be removed at this step as it will enhance the chemical bonding to the next layer. Luxatemp Star was then injected into impression #1 and placed over the first stage of the esthetic temporary bridge. After polymerization of the resin and removal of the impression #2, the two-layer bridge was obtained (Fig. 8).

Once its upper un-polymerized layer has been removed, the temporary bridge may be removed and finished. To do this, large-grain polishing disks are first used to eliminate all excess before performing the polishing and shining steps (Fig. 9). The bridge is then sealed with a special glaze (Luxatemp Glaze&Bond) and offers immediate esthetic satisfaction (Fig. 10).

This provisional treatment, which was well tolerated by the patient, allowed the treatment plan to be completed calmly, and lead times for a complete soft tissue healing and necessary preparations were properly respected. It confirms the esthetic and functional selections made and facilitated the success of the final result (Fig. 11).

Fig. 9: After removing of the superficial oxygen inhibition layer with alcohol, the raw bridge was finished with abrasive discs (Shofu) and polished with several discs.

Fig. 10: At the end, the bilayered temporary bridge offers a better natural aspect with good esthetic and gloss results.

Fig. 11: Final Result after cementation of the Zirconia-based crowns and bridges (Procera, NobelBiocare).

Conclusion

The technique described in this article is based on the cut-back principle, which is well known to practitioners and dental technicians. It has the advantage of providing excellent adhesion between the two layers of resin thanks to the presence of the first un-polymerized upper layer, which polymerizes secondarily when the enamel resin is added. In this sense, this method can be distinguished from the techniques in which cut-back is done directly in the final form of the polymerized resin mass. The permanent availability of the silicone impressions also allows us to handle any repairs or changes to the temporary bridge, quickly and spontaneously.

Finally, despite the need for initial prosthetic work, this technique remains cost-effective compared to a temporary laboratory fabricated bridge.

Contakt:

Dr. Olivier Etienne
DDS, PhD
Assistant Professor in Prosthodontics
1, rue de la Division Leclerc
67000 STRASBOURG
FRANCE

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