**Simulation of esthetic treatments applying a chemical polymerisation composite resin**

This article illustrates a simplified mock-up technique used for diagnosis and planning of oral maxillofacial rehabilitation work and offers also a preview of the final results.

**Introduction**

In all types of dental treatment, the dental surgeon should always remember that the first contact with the patient is very important. During the first consultation it is very important to establish a good relationship with the patient. The clinician should never create a situation of subordination with his patients as this would not result in a good, professional relationship. The dentist should listen and learn to establish their actual needs. The needs of each patient are directly related to their expectations and their self-image. A patient may imagine that there is no solution for their case, but may also want to know about the technical possibilities, challenging the dentist to answer expectations in situations which sometimes present extreme limitations.

The most important rule in these situations during a first appointment is not to raise false hopes that will lead the patient to believe in miracle solutions. A good communication in a first contact will bring safe guidelines for the patient who will trust at all stages of the dental treatment in the doctor who is helping them.

When dealing with oral rehabilitation work involving dental esthetics to a large degree, the professional needs to be able to rely on excellent resources and well-founded knowledge to deal with the complex procedures involved in restoring the natural esthetic appearance and correct function of his patient’s teeth. Photographs, diagnostic wax models and any data collected during the process of clinical examination and anamnesis will facilitate the planning of the treatment and will also improve the understanding of the patient and the results that can be obtained at the end of treatment.

In many cases, patients will feel insecure and ask the dentist treating them if there is a way to view the final outcome of the esthetic treatment before its conception. We must bear in mind that the concept of beauty is individually different, varying from person to person according to self-perception, therefore mock-ups are indispensable tools for the professional who works in the area of rehabilitation, and a composite resin is one of the best materials for that purpose.

The first model casts are extremely useful and can offer insight for the patient and allow them to experience the physical conditions that the changes in their mouth will provide after the rehabilitation with laminate veneers, crowns or restorations. With real simulations made directly in the mouth, the patient will understand the position of the lips, phonetics and the probable occlusion after the treatment.

Composite resins cured through chemical polymerization, especially those used for making
temporary crowns, are suitable materials for this type of clinical application. Many of these materials exhibit low contraction and little heating during polymerization, which is of great benefit to the patients and the dentist.

There are on the market some materials that exhibit the basic requirements for a material suitable for the mock-up technique. Reviewed below are the main positive requirements:

- Chemical polymerization: because, in many situations, the material will be used together with preliminary impressions that prevent light penetration from our light-curing units through this impression;
- Appropriate esthetic properties simulating the natural appearance of the teeth: Therefore composite resins are preferable, because they possess superior esthetic properties compared with conventional, acrylic resins;
- Ease of finishing and polishing in the mouth: This emphasizes the advantage of composite resins which permit good finishing and polishing with diamond burs, sand paper discs and special polishing brushes;
- Vita scale: This helps the shade selection procedure when the definitive restorative system needs to be selected;
- Speed of use and simplicity in application: advantageous because the mock-up procedure must be quick, bringing as little discomfort as possible to the patient.

The following illustrations show the sequence of a mock-up procedure using a temporary material (Structur 2 SC, VOCO), providing the patient with a realistic visualisation of possible outcomes to be obtained after completion of the treatment:

Figures 1, 2 and 3: initial situation - the patient suffered from severe abrasion on the incisal edges, as well as diastemas, which resulted in an unaesthetic appearance.

Figures 4, 5 and 6: a diagnostic model cast helps visualise the potential result of the treatment.
Figure 7: Structur 2 SC and Structur 2 QM (VOCO) systems, both highly aesthetic composite resins, used for long-term temporaries and cured through chemical polymerisation, are used to create the simulation of the possible treatment. This simulation creates better conditions to help the patient’s understanding and to improve the communication with the dentist. Another advantage of this kind of temporary material is its Vita scale shade system, which offers a good evaluation of the tooth’s shade, thus facilitating the final restorative steps using direct or indirect techniques with materials based on the concept of Vita scale;

Figure 8: resin based systems presented in self-mix syringes make it possible to insert large amounts of material;

Figures 9, 10 and 11: after letting the impression made on the diagnostic model cast set in the mouth, we apply the composite resin Structur 2 SC and take the same impression back to the patient’s mouth. Over a period of 1 minute after the insertion of this impression, we can remove it to observe if the resin has filled in all the areas for which esthetic treatment simulation is required;

Figures 12, 13 and 14: after removal of the impression, if it is observed that some material remains stuck to the teeth, possible defects must be repaired by inserting more material.
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Figures 15 and 16: with a short polymerisation time of less than 5 minutes, the finishing and polishing procedures can be performed immediately;

Figures 17, 18, 19 and 20: After the final step of polishing, the patient will be able to examine the simulated treatment and thus take the best decisions together with their dentist.

The system used, Structur 2 SC, is quick to use and efficient, enabling the dentist and the patient to experience in a short space of time a visualisation of the result that, in certain cases, will be achieved after weeks or months of extensive treatment.

In techniques such as the mock-up procedure it is essential to make it clear to the patient that this type of procedure only offers an idea of the possibilities of treatment and does not aim to create a false expectation, because dentistry, in general, has its limitations that may compromise the outcome achieved.

The main issue that we must always take into account is that this procedure is of great assistance in the professional diagnostic procedure, helping to detect in advance potential difficulties that may occur during the course of rehabilitation treatment.

Fig.15 and Fig.16: with a short polymerisation time of less than 5 minutes, the finishing and polishing procedures can be performed immediately; 
Fig.17, Fig.18, Fig.19 and Fig.20: After the final step of polishing, the patient will be able to examine the simulated treatment and thus take the best decisions together with their dentist.

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