The mock-up: A clinician’s everyday tool for aesthetic dentistry

By Dr Yassine Harichane, France

For a wax-up, also known as a diagnostic wax model, laboratory wax is used to create an aesthetic concept model based on the patient’s plaster model. However, its aesthetic and functional use is limited. From an aesthetic perspective, even though the wax does not reproduce the tooth shade perfectly, it facilitates visualisation of the shape and position of the teeth in the concept model. As far as function is concerned, even when a high-performance articulator is used, it is still difficult to replicate the full range of masticatory movements.

The mock-up, essentially a preview produced from composite, is a technical tool all too rarely employed by dentists, but that proves exceptionally practical in a wide variety of situations. In this way, the patient plays an active role in the decision-making process, which considerably improves communication.

It is important to note that communication with the dental technician too is optimised in the any corrections, a duplicate of the mock-up is sent to the laboratory. The dental technician now has all information, additional information, with which he or she can combine it to achieve a predictable aesthetic result.

Treatment plan

Mock-ups are suitable for treatment in the anterior region requiring corrections to the shape of teeth through the addition of material and, to a lesser extent, adaptation of the position of the teeth. The main indications are thus loss of substance on vital teeth, missing individual teeth, diastema or other congenital anomalies. In such cases, it is always worth asking the dental technician to send additional wax with which any corrections requiring addition of material can be performed. The wax-up is then shown to the briefed patient (it is a 3-D simulation of the concept design)—and the limitations (the tooth shade cannot be replicated in a wax-up) mentioned—and it is compared with the plaster model without wax-up in order to determine the improvements objectively. Once the patient has accepted the wax-up and any necessary corrections have been made, the wax model is transferred from the plaster model to the patient’s mouth in order to simulate the treatment intraorally. These steps are described in the “Step by step” section.

A diagnosis has been established and the type of treatment selected, the dentist orders a wax-up based on the patient’s tooth model. Of course, he or she needs to inform the dental technician in the laboratory of what he or she expects in terms of shape and position, but not yet the shade. The first step is for the dentist to validate the wax-up on the model, this allows him or her to make any necessary corrections directly in the practice using suitable materials. It is always worth asking the dental technician to send additional wax with which any corrections requiring addition of material can be performed. The wax-up is then shown to the briefed patient (it is a 3-D simulation of the concept design)—and the limitations (the tooth shade cannot be replicated in a wax-up) mentioned—and it is compared with the plaster model without wax-up in order to determine the improvements objectively. Once the patient has accepted the wax-up and any necessary corrections have been made, the wax model is transferred from the plaster model to the patient’s mouth in order to simulate the treatment intraorally. These steps are described in the “Step by step” section.

The mock-up is shown to the patient in order to determine the optimal tooth length and the general proportions of the new smile. It is still possible to make corrections at this stage. After any corrections, the dentist and patient approve the mock-up and an impression is taken, which is then sent to the laboratory, where it serves as a reference for the final production of the concept model.

Materials

Mock-ups are easy to produce in routine clinical practice as long as there is sufficient material available and the user masters the necessary skills in advance. In this article, I describe a technique in which a self-curing composite (Structur 3, VOCO) is used. As a result, the composite (in this case, Shade A1) is selected in accordance with the patient’s tooth shade. The guide is tried in the mouth and any necessary corrections made with a scalpel. The shaded area is then selected in accordance with the patient’s expectations and the tooth shade of the natural teeth.

The impression is filled with the composite (Fig. 9) and inserted into the mouth (Fig. 10). The impression is removed, at the earliest, 1.5 minutes after mixing (Fig. 11). However, final processing can only be performed after 4 minutes. The shape is adjusted either by means of contouring in conjunction with water cooling, as in the case of conventional composites, or by filling defects with a flowable composite (Erando Flow, VOCO; Figs. 12–14). Finally, the structure and dynamics of the occlusion are verified.

Once all adaptations have been completed, the mock-up is presented to the patient (Figs. 12–14). A plaster model serves as the basis for production of the wax-up (Fig. 6). An impression is taken of the wax-up (Figs. 7 & 8), which is used as a guide in the mouth to ensure the accuracy of the wax-up. The guide is tried in the mouth and any necessary corrections made with a scalpel. The shade of the self-curing composite (in this case, Shade A1) is now selected in accordance with the patient’s expectations and the tooth shade of the natural teeth.

Step by step

The clinical case presented here to illustrate the workflow was a consultation for aesthetic reasons. The patient wanted to improve his smile considerably without resorting to invasive techniques, and as such decided to seek advice from a consultant before embarking on a treatment plan.

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the patient for his or her aesthetic approval regarding shape, position and tooth shade. If necessary, further adaptations can be effected in the same way, that is via contouring or filling with composite. The data is sent to the laboratory as photographs (portrait, smile and intra-oral, Figs. 15 & 16), along with an impression of the mock-up and the analysis of the smile. The dental technician in the laboratory then has the necessary and sufficient information at his or her disposal to produce the actual prosthetic restoration in accordance with the patient’s and dentist’s wishes.1,2

At the end of the treatment session, the question remains as to what to do with the mock-up. The dentist has the choice of two possibilities. One option involves removing the mock-up and permitting the patient to test the articulation, lip support, etc. (too long or too severely curved teeth may be positioned outside of the shape of the wax-up. The technique is also not indicated in cases presenting a contraindication, as the teeth may be positioned outside of the shape of the wax-up. The technique is also not indicated in cases in which enameloplasty is required (too long or too severely curved tooth)).

Discussion

The mock-up technique offers a whole range of advantages. The quick, cost-effective method allows the patient to assess the desired result in his or her mouth.3 Until now, patients were along with dentists’ decisions without being actively involved in the treatment plan, and this occasionally resulted in unexpected outcomes and possible conflicts. A waiting period with temporary restorations makes it possible to assess the required result, but is not indicated in clinical cases with conservation or non-invasive approaches. In future, the patient will be able to try out his or her new smile in order to become used to it quickly and even go home wearing it to test it extensively from an aesthetic, functional and psychological perspective. Patient compliance increases, as he or she can follow the treatment plan more calmly and is better informed. In addition to improved patient communication, communication with the dental technician is facilitated. Owing to the impression and photographs of the mock-up in the mouth, the dental laboratory has at its disposal a wealth of invaluable information, which was not systemically provided in the past.4 The dental technician is then able to test the wax-up not only from a functional perspective (structural and dynamic occlusion, position of the free margin for articulation, lip support, etc.) but also from an aesthetic perspective (tooth shade, shape and volume of the teeth, smile symmetry, smile alignment with regard to facial aesthetics, etc.) The user friendliness of the material means this technique is suitable for use in routine clinical practice.

For the dentist, this technique is just as easy to perform as the production of temporary crowns. There is no need for a rubber dam, as the mock-up is produced under the same conditions as for a temporary crown. In addition, this non-invasive technique does not require preparation, retention, bonding or anaesthesia. The patient will certainly appreciate this tissue-preserving approach. As such, the patient will perceive the treatment as more of an adventure.5 Of course, however, mock-ups are not without their restrictions. Their indication is restricted to prosthetic restorations in the anterior region, with severe malformations representing a contraindication, as the teeth may be positioned outside of the shape of the wax-up. The technique is also not indicated in cases in which enameloplasty is required (too long or too severely curved tooth). As production of a mock-up requires a certain degree of dexterity, it should be initially practised on a plaster model before work is performed directly in the patient’s mouth. The therapeutic treatment of a patient may require a longer period; even though the mock-up phase can be very informative and useful for patient communication, it remains an additional, facultative phase. Furthermore, dentists who do not use self-curing composites for temporary restorations could view procurement of these materials as an additional cost factor. However, it is worth weighing up the fact that the mock-up could considerably improve patient acceptance in an extensive treatment and thus the investment could indeed be worth it. Nothing is more frustrating for a dentist than investing time and effort in the development of a long, complex treatment plan only for it to be rejected by the patient because it fails to meet his or her expectations.

From the dental laboratory’s perspective, this method provides the dental technician with additional information, which allows him or her to tailor his or her work precisely to the patient’s and dentist’s expectations. The improved communication reinforces the cooperation between the dentist, patient and dental technician.

Note

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