Full-mouth rehabilitation

using **Essentia** composite and **OPTIGLAZE colour** characterisation material in combination with a multi-layer thermoforming technique based on wax-up

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Clinical case report by **Dr Iñaki Gamborena**

The increasing reliability of composite restorations has made them a genuine alternative treatment for full-mouth oral rehabilitation and a conservative option when recreating to a certain degree the function and aesthetics lost by the patient. Performing a full-mouth rehabilitation with composite represents a great challenge, especially in regard to the creation of interproximal contacts as well as ideal contours and occlusion, while still ensuring a natural integration of the restorations with the original dentition.

Technique

This clinical case report outlines a simple technique for full-mouth rehabilitation using a thermoformed tray to create direct composite restorations. This technique consists of creating a full-mouth rehabilitation wax-up, duplicating it in stone and then using a thermoforming device to create a guard that will be used to mold the direct restorations. This guard is obtained using a highly precise transparent PET-G thermoplastic (belonging to the polyester group) and a Biostar pressure-molding (thermoforming) machine, which will heat the sheet of plastic and press it (with 20bar pressure) against the stone duplicate of the wax-up. The advantage of this method is that it provides a reliable duplicate of the wax-up, free of any distortion and precisely reproducing the sculpted anatomy.

Figures 1 & 2 Initial situation: 28-year-old female patient displaying generalised tooth erosion due to gastric reflux and high consumption of carbonated drinks.

Patient

A 28-year-old female patient came to the clinic with severe generalised tooth erosion (Figures 1 & 2), essentially due to gastric reflux and the intake of three litres of acidic soft drinks per day. Care was taken to explain to the patient the dangerous consequences this could have on her general condition as well as her oral health. It was mutually agreed that she would stop consuming carbonated drinks during and after the rehabilitation. The patient was offered several alternatives to restore her dentition (lithium disilicate onlays and veneer restorations) but due to financial concerns it was decided to restore her eroded teeth using direct composite and to arrange regular recall visits to monitor the wear.

Treatment

An aesthetic mock-up was directly performed with an enamel composite (Essentia Light Enamel, LE) in order to restore the missing tooth structure from canine to canine (Figure 3). This allowed the patient to visualise the amount of lost tooth structure and the expected aesthetic outcome to be achieved after completion of the treatment (Figure 4). Once the patient approved the aesthetic result, composite restorations were performed on the lower canines to open the bite and to allow the reconstruction of the posterior occlusal anatomy. This step is also important because it enables us to give the lab technician a precise vertical dimension.

Figures 3 & 4 The clinical assessment of the tooth structure loss in the anterior front teeth is performed using a composite mock-up, in order to discuss with the patient the expected aesthetic outcome. This is an important step in the aesthetic evaluation that is necessary to get the patient's approval before any further work is performed.

A precise wax bite registration of the centric position and open vertical dimension was then established (Figure 5) and sent to the dental technician along with silicone impressions of the composite mock–ups on the upper and lower arches. In this way, the technician was able to mount with precision the master models (Figure 6) and to recreate the missing tooth structure using wax.

Figures 5 & 6 Composite restorations are performed on the lower canines following an ideal occlusal plane, and the vertical dimension is assessed clinically in order to transfer the increased correct centric bite and diminish the posterior occlusal adjustments. Full-contour wax-up of the missing structure is then performed in order to satisfy the functional stability of the rehabilitation.

Three different models were produced: one representing the original situation with erosive wear (Figure 7), one showing the wax-up of the missing tooth structure (Figure 8) and the third one duplicating the wax-up in stone (Figure 9).

Figures 7, 8 & 9 From initial situation to diagnostic wax-up and stone duplication.

The upper and lower thermoformed trays (dual-layer) were then fabricated using the pressure-molding machine Biostar. The first thermoforming step was made using Copyplast (0.8mm), a visco-elastic material that does not bond to composite or acrylic. The second thermoforming (made on top of the first one) was performed with Duran (2.0mm), a more rigid material that bonds to acrylic - providing stability and strength to the dual-layer tray (Figure 10). The two-layer thermoformed tray was then tried in the mouth (Figure 11) and relined against the lower arch (Figure 12) with clear acrylic to increase the strength and create pressure through the bite during composite insertion into the tray. The same was done with the lower arch against the upper as shown in Figure 13.

Figures 10, 11, 12 & 13 Using the stone duplication wax-up, two consecutive vacuum thermoforming steps are performed. This two-layer thermoforming tray is then tried in the mouth and relined against the lower arch with clear acrylic.

In this case, interproximal contacts had been recreated in a previous session, in which caries control was also performed. To maintain the integrity of the interproximal contact points and cervical contour, some Teflon was packed below the interproximal contacts (Figure 14).
Two layers of composite were used, starting with a dentin layer that was placed on all teeth at once on the entire arch. Essentia composite (GC) was chosen for its user-friendly shade selection and its viscosity, which allows an easy application before inserting the tray. When the patient bit on the tray, the anatomy previously created on the wax-up was reproduced by "pressure-molding". After the light-curing step, the tray was removed and some dentin anatomical adjustments were carried out with a bur in order to create more space for the second enamel layer.

Before the enamel layer was applied, the cervical anatomy was finalised with the help of burs, and internal brown stains (OPTIGLAZE colour, GC) were used to provide a more natural look to the final composite restorations. After light-curing the stain, the second layer of enamel composite was applied on the whole arch on top of the dentin. At this stage, care must be taken with respect to the quantity of material applied in order to avoid excesses and bubbles. In this case, Essentia Medium Dentin (MD) was used as the dentin shade and Essentia Light Enamel (LE) as the enamel shade.

Once the full contour with the final layer of enamel composite had been (Figure 15), a layer of external stain was applied to create a better blend between the composite restorations and the existing tooth structure. OPTIGLAZE colour was used to emphasise the incisal and interproximal characteristics and provide a more natural look to the restorations (Figures 16, 17 and 18). The same procedure was then performed for the lower arch.

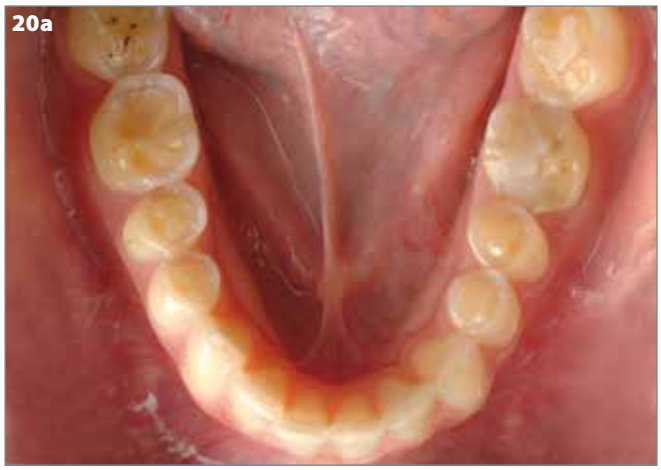
Figure 14 Some Teflon is packed below the interproximal contacts to maintain the integrity of the interproximal spaces.

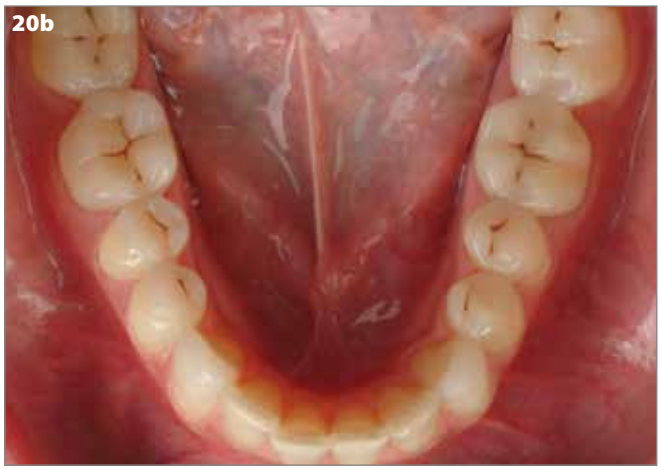
Figure 15 Clinical result after applying two consecutive layers of composite (first dentin, then enamel).

Figures 16, 17 & 18 Application of an external characterisation glaze, OPTIGLAZE colour, to improve the integration of the restoration within the natural dentition.

We can see the final results of the upper and lower arches before and after full-mouth rehabilitation with Essentia composite (Figures 19 & 20) and a close-up view of one of the posterior quadrants (Figure 21).
One crucial step is to carefully handle interproximal contacts; this can be done by defining precisely the marginal crest and delimiting the interproximal contacts on the stone duplicate. Interproximal contacts were polished and re-contoured with #15 and #12 surgical blades.

Figures 19a & 19b Upper arch before and after full composite reconstruction using Essentia Medium Dentin MD, OPTIGLAZE colour Brown stain and Essentia Light Enamel LE with White, Lavanda and Olive colours.





Figures 20a & 20b Lower arch before and after full composite reconstruction.

Figures 21a & 21b Close-up characteristics before and after the posterior composite reconstructions using just two layers (dentin, enamel and internal staining).

We can appreciate the advantage of using internal stains on the occlusal surface of posterior teeth, but it is even more eloquent on the palatal view of the upper anterior teeth (Figure 22), and looking at line angles and mamelons. Although no preparation was performed on the teeth in this case, the composite is perfectly integrated thanks to a great chameleon effect (Figures 23 & 24).

Figures 22a & 22b Palatal view of the final composite restorations after polishing.

After this rehabilitation, a night guard (Figure 25) was given to the patient to protect the composite reconstructions and to prevent the reoccurrence of wear. The patient will be recalled every six months for us to check the restorations.

Figures 23a & 23b Comparison before and after the rehabilitation, showing what composite restorations can achieve, as a simple solution for this type of patient. No preparation was needed, making it a very conservative approach requiring only composite additions based on a precise wax-up and bite registration.

Figure 24 Final full-mouth composite rehabilitation using Essentia from GC in combination with a powerful tool: the characterisation kit of OPTIGLAZE colour.

Figure 25 A night guard was given to the patient after the treatment to prevent the reoccurrence of wear.