

## Restorative treatment of a previously whitened tooth

Dr Gonzalo Llambes Arenas & Dr Jose Amengual Lorenzo

### ABOUT THE AUTHORS (SPAIN)

#### Dr. Gonzalo Llambes Arenas

Associate Professor in the Department of Stomatology. University of Valencia (UV).  
Co-director in Large Build-ups Certificate (UV).  
MBA Professor in Endodontics (UV).  
Diploma Program Professor in Techniques for Dental Whitening (UV).

#### Dr. Jose Amengual Lorenzo

Associate Professor in the Department of Stomatology. University of Valencia (UV).  
MBA Professor in Endodontics (UV).  
Co-director in Large Build-ups Certificate (UV).  
Diploma Program Professor in Techniques for Dental Whitening (UV).

### SUMMARY

This paper discusses restoring previously whitened teeth using a composite resin.

A 45-year old woman's teeth were whitened for eight weeks (2hrs/day) using Pola Night 16% carbamide peroxide take-home tooth whitening treatment in custom-made trays. The whitening degree was measured using a Vita Easy Shade Compact spectrophotometer (VITA, Bad Säc-kingen, Switzerland), showing a 7.6  $\Delta E$  minimum rate and a decreased EW rate on all teeth. Two weeks after completion of the whitening treatment, we proceeded to restore the indicated teeth by using a direct technique with Aura Ultra Universal Restorative Material.

Once satisfactorily whitened, her teeth were restored in the most conservative manner possible.

ONCE THE WHITENING TREATMENT ENDED, WE CONDUCTED BONDING RESTORATIONS ON INDICATED TEETH USING A DIRECT TECHNIQUE WITH AURA ULTRA UNIVERSAL RESTORATIVE MATERIAL.

### INTRODUCTION

Composites are materials that are manufactured in various shades and opacities. This feature is beneficial in solving many dental aesthetic problems.

Not all composites have the same clinical behaviour over time. For instance, macro particle resins change tooth colour easily due to their opacity, but they

cannot be well polished due to the particle size. On the other hand, micro particle resins available in the market have great long-term polishing properties, but as a result of their low wear resistance, their use is not indicated for posterior teeth. In contrast to the aforementioned, hybrid and micro-hybrid resins have acceptable polishing properties and clinical behaviour. In addition, they have very good wear resistance that makes them suitable for both anterior and posterior restorations. Finally, nanoparticle resins show excellent polishing and wear-resistance properties that makes them suitable for anterior and posterior teeth.

Composites are the material of choice for direct treatments, requiring less aggressive preparations than porcelain and fewer in-office visits, bringing lower costs for the patient. In most cases, replacing and reproducing the colour and texture of dental tissues is successful.

To restore anterior teeth, fluorescent highly aesthetic materials of varying shades and translucency with good polishing properties are required. Preferably, a micro particle composite should be placed on the restoration as the last layer. For posterior teeth, high strength materials with low wear and low polymerization shrinkage are required.

Often, such as in the clinical case described below, patients whose teeth have been previously restored with composite resin prefer to have their teeth whitened prior to aesthetic replacement of their fillings. In those cases, studies tell us that whitening products do not alter the enamel, the colour nor the structure of nanoparticle resins; but they do affect the micro-hybrid resins' interface and roughness.

### MATERIALS & METHOD

A 45-year-old woman showing various cosmetic dental problems (Fig 1) attended the dental office. She presented with very old composite restorations. The restorations were stained and the shades were aesthetically poor. She was not happy with the base shade of her teeth and the incisal edges of her maxillary incisors showed excessive wear.

The patient wanted her aesthetic problems solved and a treatment plan was proposed as follows:

- Her teeth were scaled and polished.
- "Take home bleaching of vital teeth on both arches using custom-made trays with vestibular spacers were suggested. Replacement of old fillings with new ones on teeth 11, 12, 21 and 22



**Figure 1.** Pre-treatment photograph. The patient shows teeth that appear dull and dark. The existing composite resin restorations were stained and worn with poor polish

After scaling and polishing the teeth, alginate impressions were taken. Working models were prepared and used to make two different trays: one for diagnostic / positioning purposes (Figure 2) and the other for therapeutic purposes.



**Figure 2.** Diagnostic trays to place the spectrophotometer sensors at the same position.

ALL TEETH WERE SUCCESSFULLY WHITENED AND THEY WERE RESTORED IN THE MOST CONSERVATIVE WAY POSSIBLE.

Before starting the whitening / bleaching treatment, pre-treatment photographs were taken for patient's record. For measuring the colour parameters of CIE Lab space (L \*: lightness; a \*: variation in the red-green axis and b \*: variation in the yellow-blue axis), the Vita Easy Shade Compact spectrophotometer (VITA, Bad Säc-kingen, Suiza), was employed using the four canines as index teeth. The maxillary central incisors were not used since they showed existing composite restorations in the test areas.

The  $\Delta E$  indexes (difference between the starting and final colour of analysed teeth) were calculated and the EW index was determined, which represents the distance between the starting colours of these teeth and the post-treatment colour achieved with regard to the top-whitening point of CIE Lab space (o coordinates L \* = 100, a \* = 0, b \* = 0). For these



colour measurements, diagnostic trays were used in order to place the spectrophotometer sensor in the same area and thus assess the same tooth portion in each measurement. The whitening product used was Pola Night 16% (SDI, Victoria, Melbourne, Australia,) which is a 16% carbamide peroxide base gel - two hours a day on a daily basis; the product is placed into therapeutic trays following the manufacturer's instructions.

Biweekly checks were conducted, taking pictures and recording the colour in order to monitor the treatment progress.

After four weeks, the whitening treatment was considered complete as the colour parameters had stabilized (Table 1.) Again, pictures were taken for our records (Figure 3).



Fig 3.

**Figure 3.** After using the take home whitening treatment (Pola Night 16%) for eight weeks.

After two weeks, we replaced the old restorations. All existing composite from teeth 11, 12, 21 and 22 were removed in order to prevent possible leaks. Complete isolation of the operative field was performed using a rubber dam (Figure 4).

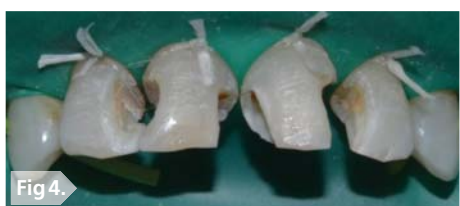


Fig 4.

**Figure 4.** Complete isolation of the operative field. Cavities prepared for bonding restorations using composites -after removing the old fillings.

Due to the condition of the remaining tissue of teeth, some veneers were prepared with a total etch bonding technique using the single-component bonding material STAE (SDI, Victoria, Melbourne, Australia) and the composite AURA (SDI, Victoria, Melbourne) Australia.

Employing a layering technique, first we placed the DC1 shade for the dentine mass and subsequently - covering the entire labial surface - using enamel shade E1 (Figure 5).



Fig 5.

**Figure 5.** Final picture of the case. Aura composite veneers on teeth 11, 12, 21, 22.

Tooth whitening is an effective, safe and predictable treatment, provided it is carried out by highly qualified professionals who know the indications and contraindications of the technique since the chemical features of these products may cause injuries to the oral tissue if not properly used.

In this case, a lower concentration product was used. They are used in take home treatments since they require a longer time to get results (compared to high-concentration products used for in-office treatments;). Accordingly, this is a safer treatment. Results obtained by take-home treatments are more stable and durable over time.

Diagnostic trays intended for the use of spectrophotometer allows for the objective assessment of the colour change in treated teeth using whitening products.

Based on the outcomes achieved, we can state that the colour of the treated teeth changed to white, as the  $\Delta E$  exceeded (at least) a value of 7.6. Accordingly, we accept that results obtained after executing a whitening treatment can be seen with the naked eye when  $\Delta E$  values are set above two. Likewise, the EW rate decreased in all teeth assessed.

|      | Inicial |     |      | Final |     |      | $\Delta E$ Final | EW Inicial | EW Final |
|------|---------|-----|------|-------|-----|------|------------------|------------|----------|
|      | L       | a   | b    | L     | a   | b    |                  |            |          |
| 1.3: | 66,7    | 2,7 | 23,7 | 76,9  | 0,9 | 15,5 | 13,21            | 40,96      | 27,83    |
| 2.3: | 63,7    | 3,4 | 23,2 | 71,3  | 0,8 | 12,9 | 13,06            | 43,21      | 31,47    |
| 3.3: | 73,1    | 2,9 | 22,8 | 76,6  | 1,4 | 15,5 | 8,23             | 35,38      | 28,10    |
| 4.3: | 71,8    | 2,7 | 21,2 | 76,2  | 1,6 | 15,1 | 7,60             | 35,38      | 28,23    |

**Table 1.** Values of CIELab system recorded, including those after calculating the  $\Delta E$ , EW rates.

## DISCUSSION

In contrast, no change in shade of present incisor fillings was observed. Therefore, we must warn patients that tooth restorations do not whiten and accordingly, all restorations - as applicable - should be replaced after the bleaching treatment.

You need to let the shade of treated teeth stabilize; as it may change once treatment is complete. You must also give some time for the degradation products released from bleaches (free radicals, oxygen etc.) to disappear and the possible changes that whitening products can create in dental structures to recover since both circumstances might reduce the bonding strength between composites, other restorative materials and dental tissues, and interfere in their polymerization. Accordingly, in order to make a composite filling on a whitened tooth, wait for a reasonable amount of time before doing so. According to the literature, it might take from 24 hours to four weeks.

## CONCLUSIONS

- The patient got her desired smile back.
- Pola Night 16% whitening treatment changed the shade of all treated teeth. The restorative treatment was limited to the four upper anterior teeth.
- Composite resin veneers restored the tooth anatomy that the patient had lost, allowing restoration of the worn incisal edges.
- The use of Aura Ultra Universal nano-hybrid resin guarantees an outstanding polish as well as more stable and durable restorations over time.

