Introduction

The desire for whiter teeth has considerably increased in the last few years. The demand for tooth bleaching as a cosmetic treatment is increasing more and more, despite the recession, which only marginally affected aesthetics and cosmetics.

Nowadays, we live in a world where appearance is extremely important in any field; according to independent studies conducted for the American Association of Cosmetic Dentistry:

- 99.7% of Americans are convinced that a bright smile is an important social factor;
- 96% of adults are convinced that an unpleasant smile may have a negative influence on career opportunities;
- 74% of adults think that an unpleasant smile may have a negative influence on career opportunities.

We are also aware that the desire of having a bright smile with white teeth has existed for centuries, but the research in this sector has only stepped notably forward during the past few decades.

This happened especially at the end of ’80s, thanks to Dr Eyneman and Dr Aiwood,1–4 who conceived the idea of home bleaching treatment with the use of the well-known bleaching trays, customised or not, adequately filled with low-percentage hydrogen peroxide and worn for some hours a day or even all night long.

Afterwards, the companies of the dental field worked hard to improve these procedures, such as designing pre-filled trays or changing the flavour of the gel. The method is substantially the same, only the percentage of hydrogen peroxide (also available as carbamide peroxide) may vary from 10% to 30%.6–7 This influenced the contact period, which is at least from a couple of hours a day (for percentages that are only allowed for cosmetic bleaching) to all night long. All of them start from a single assumption: the bleaching action of peroxide needs a variable contact period to penetrate through the enamel prisms and the dentinal tubules, releasing active oxygen and allowing the free radicals to attack the chromophobe particles and reach the desired effect.9

Materials and methods

After years of attempts and experimentations used to improve the current methods and the result, I have managed to refine a new method,
making it easy and above all reducing the daily duration of the treatment to only two minutes instead of 6–8 hours of the traditional cosmetic home bleaching: I have optimised the method in an extreme way.

After several tests, I deduced that peroxide, if activated by a special accelerator (XS 151) could penetrate in a faster way, exploiting the action of mechanical pressure generated by a special toothbrush with nozzle-doser and a dispenser filled with DHJ 1/10 cosmetic dentistry beauty & science

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Table I. Group 1 treated with tray and 6 % hydrogen peroxide. Group 2 treated with the new system ENA White 2.0. In red: suspended treatments.
industry report _ professional home bleaching

This special bleaching substance (Fig. 1). This special bleaching toothbrush has been designed with a smaller head if compared to the most common toothbrushes in order to reduce the contact with oral mucosa. Soft blunted bristles activate the accelerator (XS 151) contained in the gel while brushing and guarantee a faster absorption of the bleaching gel; it also improves the procedure by drastically reducing the application time: from 6–8 hours to two minutes per day! The advantages are amazing, because reducing the contact period means reducing enormously the undesirable effects: inflammation of soft tissues, hypersensitivity, risk of swallowing the gel and so on. There is also an improvement of some psychological aspects, due to the need of wearing the tray for hours or all night long with interferences with normal interpersonal relationships both in private life and at work.

The new method, as said before, considers reduced application times of about two minutes per day; it is easy to understand how this can encourage the user to apply tooth bleaching. The average total contact period of the whole treatment is less than one hour (two minutes for 20 days). This corresponds to less than one-fifth of the time that a single application with the tray technique takes, which is currently the most common mode. Furthermore, this special toothbrush with dispenser is extremely easy to carry thanks to its pocket-size and can be used for one minute in the morning and one minute in the evening anywhere, after one's usual oral hygiene routine. The treatment lasts about 15–20 days on average, and this duration is sufficient to obtain an excellent result, achieving a reduction of 1–2 chromes of the VITA shade guide depending on the subject with a minimum commitment. Wherever you want, whenever you want: you can choose the place and time of application, which makes it different from other methods. The here-analysed method respects all the recent UE laws about the use of hydrogen peroxide as a cosmetic bleaching treatment, accepting a maximum percentage of 6 %, specifying that the bleaching kits must be delivered to the user only by the dentist as a professional treatment, after an accurate visit and the evaluation of each single case.

It is also important to underline that advice and protocols are the fundamentals of what has been stated so far. First of all, the dentist must undertake thorough plaque removal, advise the patient about correct oral hygiene use, which means brushing the teeth with adequate toothpastes with special characteristics, for example, the Enamel Plus toothpaste, which has a low abrasion formula and desensitising action: this enhances and maintains the bleaching effect reached with this system. It is also important to limit the consumption of food with a high acid pH, such as citrus fruit, tomatoes, tea, tobacco etc, in order to preserve the achieved result. We also recommend to schedule regular visits with your dentist in order to monitor the condition of teeth and mucosa and point out any irritation or inflammation of mucosa; repeat the bleaching treatment regularly to maintain the results, considering that the repetition of this method decreases the undesirable effects thanks to the limited contact period of 1 hour maximum for the whole complete treatment of about 15–20 days, in comparison to the 120–150 hours or more of the traditional bleaching with tray method.

<table>
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<tr>
<th>GROUP 1</th>
<th>Age</th>
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<tbody>
<tr>
<td>Patient 1</td>
<td>25–35</td>
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<tr>
<td>Patient 2</td>
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</tr>
<tr>
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<td>240</td>
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<td>25–35</td>
<td>24</td>
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<td>Patient 7</td>
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<td>total</td>
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<table>
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<tr>
<td>Patient 20</td>
<td>46–55</td>
</tr>
<tr>
<td>total</td>
<td></td>
</tr>
</tbody>
</table>

Table II. Total time of treatment: Group 1 treated with tray and 6% hydrogen peroxide, Group 2 treated with ENA WHITE 2.0.

N.B. The Patients 4 and 7 have not been inserted into the graph because they have interrupted the treatment.

Total time of whitening treatment: first group treated with tray and 6% hydrogen peroxide, second group with ENA WHITE 2.0.

N.B. The Patients 4 and 7 have not been inserted into the graph because they have interrupted the treatment.
Comparative analysis with traditional bleaching systems

We carried out a comparative study performing 20 bleaching treatments in the same period: 10 cases were treated according to the traditional technique with tray and 6% hydrogen peroxide, and the other 10 patients with ENA White 2.0. The patients were aged between 25 and 55, and were divided into three age groups.

The first group were treated with bleaching trays and 6% hydrogen peroxide:

- Five were satisfied with the result;
- Three were not satisfied with the treatment and decided not to extend the treatment of a further 15–20 days;
- Two abandoned the treatment because they considered the application times to be too demanding; they didn’t have time to carry out the treatment as it clashed with their hours of working and/or because they felt discomfort and annoyance wearing the tray at night.

The inconveniences reported during the bleaching treatment with tray include the fact that in some cases, it was very difficult or even impossible to keep the tray in the mouth—which has a recommended time of action of several hours or all night—due to illness, for example flu, bronchitis with coughing fits, also with phlegm and colds. This was a further complaint that sometimes contributed to demotivate the user in such a decisive way as to suspend the treatment.

The second group of 10 people who used the new system ENA White 2.0 proposed by me:

We could verify the total satisfaction in nine subjects, only one of them was not completely...
satisfied because he expected a more evident effect and did not want to extend the treatment.

With regard to motivation, all of them showed a huge satisfaction, especially for how the kit had been introduced, considering it as very innovative, handy and with no limits of use. For the result details of this comparative analysis, please see Tables 1 and 2.

Clinical cases

The case report in the pictures shows a 30-year-old male with an apparently optimal health condition, who was unhappy with the discolouration on the central and upper- and lower-lateral teeth near the cervical area. After an objective examination of the oral cavity, the subject showed a normal gingival biotype, good gingival health and good oral hygiene. For the verification of the initial and final colour (hue and croma) I used the VITA shade guide, starting from A3 (Fig. 2).

After a session of professional prophylaxis I proposed to the patient the bleaching treatment Ena White 2.0 and advised him to perform it after his oral hygiene routine in the morning and in the evening. When he realised how easy the system was to use, he immediately accepted the treatment that I explained, as shown in the pictures.

First of all you show the patient how to open the toothbrush by unscrewing the cap (Fig. 3a). Then the head of the brush must be unscrewed too (Fig. 3b) to remove the seal from the base of the toothbrush (Fig. 3c). After screwing the final part of the toothbrush on the dispenser again (Fig. 13d), you must rotate the ring on the base of the toothbrush anti-clockwise towards the direction ‘UP’ until the bleaching gel comes out (Fig. 13e). For the first application, a couple of rotations are required, until the tube is filled up to the bristles. Explain to the patient that for the following applications it will be sufficient to rotate the ring of 2–3 marks to obtain the needed quantity of gel, like a small lentil, as shown in the picture (Fig. 13f).

Show the patient how to proceed with brushing: make a horizontal movement for about 30 seconds (Fig. 13g), avoiding brushing the gums as much as possible; the blunted shape of the bristles helps the patient to avoid this contact, which does not cause irritations anyway, considering the short application period. At this point it is necessary to rinse the toothbrush with water (Fig. 13h) and brush the teeth again for a further 30 seconds (Fig. 13i). In this way the residual gel on the teeth is diluted before the final rinse.

You can notice the evolution of the bleaching action in pictures from Fig. 4 to Fig. 11, where you can appreciate the final result of the treatment.
after 35 days with a shade corresponding to A1 of VITA shade guide. Halfway through treatment, a lighter chromaticity, almost equal to A2 of VITA shade guide, had been achieved, as shown in Fig. 9 (this is case No 13 in the statistic table).

The second case (No 15 of the statistic table) shows a 25-year-old female patient who was not satisfied with a bleaching treatment performed with a tray six months before, which irritated her gums. With the new treatment, she reported no discomfort and appreciated the result, as you can see in the pictures she changed from shade A3 of VITA shade guide (Fig. 12) to shade A1 (Fig. 14) in about 20 days (after 10 days, the result was already equal to A2 (Fig. 13).

_Collection_

Dental discolouration is an important factor of psychological discomfort for the patient, which leads to an increase in cosmetic bleaching requests. The new method explained here makes the bleaching procedure easier, considerably reducing the side effects that can appear with other techniques, thanks to the shorter contact period between gel and tooth.

This method allows to reach very satisfying results and produces a growth in the request of bleaching from the patient: this is attributable to both the time which is reduced (2 minutes a day) thanks to the special accelerator XS 151 contained in the hydrogen peroxide gel, which activates while brushing, and its portability, which means it can be performed anywhere and not exclusively at home, thanks to the new pre-filled brush.

_Acknowledgements_

I also thank my son Marco for supporting me during my work with his knowledge in the chemical and pharmaceutical field, acquired with his degree in CFT and the doctorate at Madrid Complutense University.

References

4. Haywood VB (1992) History, safety, band effectiveness or current bleaching techniques band applications or the nightguard vital bleaching techniques. (Quintessence International. 23,47–88)