ACTA MEDICA TRANSILVANICA June27(2):67-70
Online ISSN 2285-7079

DENTAL BLEACHING IN SMOKERS

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Keywords: *whitening, patients, non-smoking patients, colour determination treatment, Opalescence Boost 40%, smoking*

Abstract: *Tooth whitening is an increasingly common treatment in dental offices, being a minimally invasive solution for patients who want changes in tooth colour, compared to other techniques such as prosthetics. The study aims at the durability over time of the results obtained after in-office teeth whitening treatment in a single session, with Opalescence Boost 40% (hydrogen peroxide). Patients were divided into equal groups of smokers and non-smokers, they were performed professional hygiene and then the first colour determination was performed. The teeth whitening session followed and the colour was determined immediately after in both groups and then six months after the whitening treatment. Opalescence Boost 40% proved its effectiveness in a single session (2 applications of 15 minutes), the dental sensitivity after treatment being low, due to the fluoride present in this substance. The immediate result of teeth whitening treatment is not affected if the patient smokes, but the durability, colour retention are superior in non-smokers. In some cases the colour changes ranged from one colour range to another (from A2 to B1).*

INTRODUCTION

Tooth whitening, a treatment more and more common in dental offices, underlines the growing interest of patients for the appearance of their teeth, in addition to the interest in the functional part of the dento-maxillary apparatus.

Also, the increase of patients' interest for this treatment, respectively for aesthetics, leads to the need to increase the level of information about teeth whitening, in order to increase the quality of the treatments performed.

In recent years, teeth whitening treatment has taken shape in Romania as well. There are several techniques by which this treatment can be performed, including whitening at home, teeth whitening in the waiting room or whitening in the dentist's office.

These techniques use one of two substances: hydrogen peroxide or carbamide peroxide. The substances are available in different concentrations, which are used depending on the technique and the individuality of the clinical case.(1)

Tooth whitening at home is done with the help of gutters in which the substance is applied in the form of gel or paste, with which the treatment is performed.

A frequently used whitening technique is that in the dental office. It is a more laborious technique, with higher costs, but also with multiple advantages. These would include the speed of obtaining the desired result, the protection of soft tissues, manoeuvre performance under specialized control. Like any manoeuvre, it has disadvantages: the discomfort created by the use of liquid dam and the duration of sessions which can vary from 30-45 minutes, once to 6 times, at regular intervals, according to the manufacturer's instructions.(1)

The commonly used products are based on hydrogen peroxide, in different concentrations (5-40%), carbamide peroxide, which in contact with water decomposes into hydrogen peroxide and urea, chemicals that do not contain hydrogen peroxide, or crystallized sodium perborate under the form of mono-, tri-, or tetrahydrate.(2)

Hydrogen peroxide bleaches should be stored in the dark and at low temperatures, only fresh preparations should be used as hydrogen peroxide is an unstable chemical agent. The action of hydrogen peroxide as a teeth whitening agent is not fully known. It is assumed that the mechanism is that of the release of free radicals that diffuse through enamel and dentin, at which point the carbon double bonds in the pigmented molecules are broken, thus changing their size and configuration. In addition to releasing free radicals, enamel suffers from dehydration during the action of the chemical agent, which accentuates the effect of changing the colour of the teeth.(2,3,4)

The indications for whitening treatment are: dental fluorosis, patients who want to improve their aesthetic appearance and who have generalized pigmentation, smoking patients who have extrinsic staining, in case of pigmentation that occurs with age, in case of consumption of foods or beverages that contain chromogenic substances (coffee, chocolate, tea), changes in the colour of teeth with endodontic treatment, pigmentation due to drug treatment with tetracycline.(2,5)

Contraindications to teeth whitening are: pregnant women, the presence of multiple coronary fillings or restorations in the aesthetic area, dental abrasion, visible gingival retractions, multiple carious lesions.(2,5)

AIM

The aim of the study is to present the in-office teeth whitening technique in a single session, with Opalescence Boost 40% (with hydrogen peroxide as the active substance). This article also presents both the indications and contraindications of this treatment, as well as the description of the mode of action of Opalescence Boost 40%.

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Article received on 02.04.2021 and accepted for publication on 27.05.2022

The present study aims at the durability of teeth whitening results in smoking patients, at an interval of six months after the performance. A comparative study is performed on a control group, consisting of non-smoking patients, in order to analyse the differences between the two groups.

MATERIALS AND METHODS

In the first stage of this study we selected a number of 18 patients, divided into two groups with no contraindications, divided equally into two categories: smokers and non-smokers.

Figure no. 1. Dental bleaching set-up (colour key, the liquid dam and Opalescence Boost 40% whitening gel)

Figure no. 1 presents both the colour key and the liquid dam used to insulate the gingival margins and the syringes with Opalescence Boost 40% whitening gel.

Opalescence Boost is a whitening gel with the following form of presentation: a jet-type mixing syringe, which ensures the maintenance of the quality of the substances contained for each treatment, patient and new application.(3)

There are two syringes: the first, the transparent one, with the label "activating substance" contains the activator, but also potassium nitrate and fluorine (1.1% fluorine and 3% potassium nitrate). The second syringe, the red one, "Boost", contains the active substance, hydrogen peroxide.(3)

Compared to other teeth whitening substances that require special storage conditions, Opalescence Boost does not require cold storage before use. After mixing the two syringes (hold the syringes with both hands, screw them together, and for activation mix ten times on each side) the gel obtained can be used for 10 days. From the moment of mixing, however, it is recommended to keep the gel in the refrigerator at low temperatures.(3)

Opalescence Boost does not require activation with the light cure lamp.(3)

Regarding the method of use, the manufacturer recommends the application of a gingival protection such as light-curable liquid dam (shown in figure no. 1), in a layer of 1.5-2 mm thick and 0.5 mm from the tooth enamel.(3)

We applied the same treatment to patients in both groups, following the following steps:

1. We prepared the teeth before applying the whitening gel, through a professional sanitization, in order to remove plaque and tartar deposits, but also extrinsic staining.

2. We performed the first tooth colour determination with the Ivoclar Vivadent colour key (shown in figure no. 1).

3. We isolated the teeth with the liquid dam.

4. We mixed the activator with the bleaching agent, keeping it in the red syringe.

5. We checked the fluid consistency of the gel on a cotton ball.

6. We applied Opalescence Boost 40% in a layer of 0.5-1mm thick on the vestibular surface of the teeth. We extended to the interdental and incisal edges, after which we let it act for 15 minutes. Two applications are recommended in one session.

7. The second colour determination was performed after the whitening treatment.

8. Six months after treatment, we performed a third colour determination for all study participants.

RESULTS

The number of patients participating in the study was 18, divided into two categories: 9 patients representing the study group, consisting entirely of smokers and 9 representing the control group referred to, consisting of non-smokers.

Figure no. 2. Clinical case - smoker, a - before whitening technique, b - right after the whitening treatment, c - the check-up performed 6 months after the whitening treatment

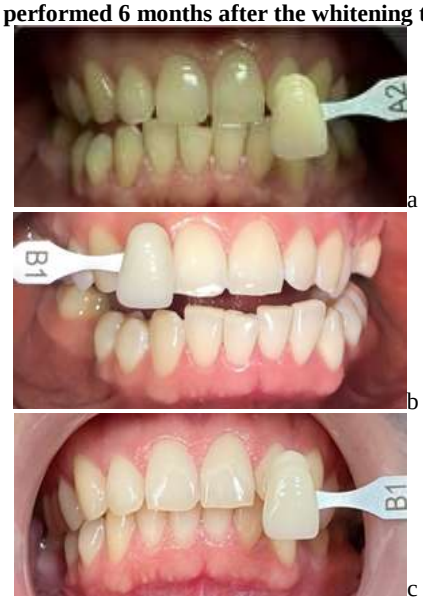
a

b

c

Figure no. 2 shows the case of a female patient, A.E. 36 year-old, smoker. You can see the result obtained after the whitening treatment, a migration from shade A3 to A1, so a change with 2 shades of tooth colour. At the check-up performed 6 months after the whitening treatment, the change is observed with a shade towards the initial colour (from A1 to A2).

Figure no. 3. Clinical case- non-smoker, a - before whitening technique, b - right after the whitening treatment, c - the check-up performed 6 months after the whitening treatment



a

b

c

Figure no. 3 shows the case of a male patient, Ț.B. 34 years old, non-smoker. The changes in this case were major, from one colour range to another, from A2 to B1. 6 months later, at the 3rd colour determination, the patient presented the

same shade of teeth as that obtained immediately after the treatment, B1.

Following treatment, significant colour changes were observed in both groups of patients. The result of the effective whitening treatment did not show differences between smoking and non-smoking patients, both groups showing favourable changes.

At the control performed six months after the whitening treatment, it was observed that only one group of patients showed negative colour changes. The teeth tended to return to their original colour.

This did not happen, but it was a slight darkening of the colour of the teeth. The situation was more favourable than the initial one, but more unfavourable than the one immediately following the teeth whitening treatment.

However, they were satisfied and aware that their teeth could not remain as white without giving up the vicious habit of smoking.

On the other and, non-smoking patients showed excellent results at check-up. The whole group of patients showed the same colour of teeth from the moment immediately following the teeth whitening, even six months after that.

DISCUSSIONS

The study by Vuletic compared two whitening techniques performed on the same patient: the one at home using Opalescence with 10% carbamide peroxide and the in-office one with Opalescence Boost 40% hydrogen peroxide. The patient is non-smoker, but consumes foods and beverages such as red wine / beets - chromatogenic foods. The in-office technique with Opalescence Boost 40% offers the desired results in a much shorter time than other teeth whitening techniques / materials.(7)

In the present study we used Opalescence Boost 40%, the same material that Vuletic used in his study, a material that demonstrates its effectiveness and speed in obtaining the results desired both for smokers and non-smokers who consume chromogenic foods.

The clinical study conducted by IEB Martins has as a starting point a common one for the two groups of patients both in terms of teeth whitening technique and the product, the active substance, namely hydrogen peroxide in a concentration of 38%. A total of 44 patients participated in this clinical trial in which the hypothesis that applying the whitening gel in a single 40-minute step would be more effective than the usual technique involving two 20-minute application in a single session was tested (according to the manufacturer's instructions). After analysing the results obtained after the evaluation of each participant in the study, no differences were observed between the two groups. A significant whitening of the dental units was observed in both applied treatment methods: 2x20 minutes and 1x40 minutes,(8)

JL De Geus looked at whether teeth whitening treatment has the same results and whether they last the same both in smoking and non-smoking patients. The treatment was performed with 10% carbamide peroxide, using the home bleaching technique. The first colour determination was performed before treatment, the next one week after completion of treatment, and the third, one month later. At the second determination, no differences were observed between the two groups of patients, in terms of the effectiveness of the teeth whitening treatment. At the last evaluation, however, there were differences - smoking patients could see a slight darkening of colour, while non-smoking patients showed minor or even non-existent changes. This study shows that the immediate result of the treatment itself is not affected if the patient smokes, but the durability, colour retention are superior in non-smokers.(9)

The conclusions of this study are similar to those in this paper, in terms of changes induced by the vicious habit of smoking in conjunction with teeth whitening treatments, more precisely with keeping the results at a given time. Even if the bleaching technique and the active substance differ, the results are similar.

Similar to the present study, Abrantes performed bleaching treatments using the in-office method. Its aim was a comparison between 35% hydrogen peroxide and 37% carbamide peroxide in terms of post-treatment sensitivity, efficacy of the two materials and durability of the results over time.(10)

It was observed that both substances provide satisfactory results for both the doctor and the patient in a short time (in a treatment session performed in the dentist's office) and that the durability was not influenced by the active substance used. The difference was observed in dental sensitivity, which was increased in patients undergoing treatment with hydrogen peroxide.

Comparing hydrogen peroxide with carbamide peroxide, no differences were observed in the efficacy and durability of the results over time. Both substances provide favourable results both in the short and long term.(10)

In the case of whitening treatment with Opalescence Boost 40%, tooth sensitivity is significantly decreased due to fluoride present in this substance, increasing patient comfort.(6)

CONCLUSIONS

1. Prior to dental whitening treatment, professional hygiene is required in order to remove plaque, tartar and extrinsic staining, especially in smoking patients where the deposits are more common.
2. The results obtained immediately after the whitening treatment were favourable in both groups of patients: smokers and non-smokers. However, the differences appeared at the effective check-up six months later, where a better preservation of the results was observed in non-smoking patients.
3. The third colour determination, performed six months after the teeth whitening treatment, showed that the habit of smoking can decrease the effectiveness of the teeth whitening treatment in terms of maintaining the colour over time.

It is well known that tobacco generates extrinsic staining and promotes plaque and tartar deposition, this was also observed in the third determination, where in smoking patients the results were different from those immediately following the whitening treatment. The shades of the teeth were darker, but the situation remained favourable to the initial situation.

In the control group, consisting of non-smoking patients, the tooth colour at the third determination was the same as the second, immediately following the whitening treatment.

4. In some cases, the colour changes were from one colour range to another (from A2 to B1).
5. Opalescence Boost 40% with hydrogen peroxide as the active substance has proven its increased effectiveness in a single session (2 applications of 15 minutes each) with no need for repeated sessions to achieve the desired result; also, sensitivity post dental whitening treatment is low due to the fluoride present in this substance.
6. Dispensarisation is necessary to control the result, check the physiological fillings and solve any problems that may occur during the teeth whitening procedure.
7. Teeth whitening is a minimally invasive solution for patients who want changes in tooth colour, compared to other techniques such as prosthetics (example: dental veneers).

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