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COMPARATIVE CHARACTERISTICS OF THE RESULTS OF PROFESSIONAL USE OF WHITENING SYSTEMS «OPALESCENCE BOOST» AND «MAGIC SMILE PRO»

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Анотація: Сучасний ритм життя диктує нам свої стандарти. Однією із вимог нового часу є гарна посмішка, а одним із головних критеріїв гарної посмішки - білосніжні зуби без слідів зубних нашарувань, пігментів та нальоту. Метою нашого дослідження було порівняння клінічної ефективності використання відбілюючих систем «Opalescence boost» та «Magic Smile Pro» для відбілювання вітальних зубів та дослідити гіперестезію як найчастіше ускладнення даної процедури. Нами було проведено офісне відбілювання зубів 62 пацієнтам у віці від 25 до 40 років. У результаті проведеного дослідження було встановлено, що відбілюючі системи «Opalescence Boost PF» та «Magic Smile Pro» мають достатню клінічну ефективність, яка більш виражена була у системи «Opalescence Boost PF». Після використання даних відбілюючих систем рідко може виникати таке ускладнення як гіперестезія, ступінь та частота якої більше виражена при застосуванні системи «Magic Smile Pro».

Ключові слова: відбілююча система, гіперестезія, «Opalescence Boost PF» та «Magic Smile Pro».

Abstract. The modern rhythm of life dictates its standards to us. One of the standards of the new time is a beautiful smile, and one of the main criteria for a beautiful smile is snow-white teeth without traces of dental plaque, pigments and plaque. The purpose of our study was to determine the comparative clinical effectiveness the use of whitening systems «Opalescence boost» and «Magic Smile Pro» for whitening of the vital teeth and to investigate hyperesthesia as the most common complication of this procedure. We performed in-office teeth whitening in 62 patients aged 25 to 40 years. As a result of the study, we found that the whitening systems «Opalescence Boost PF» and «Magic Smile Pro» have sufficient clinical efficacy, which was more pronounced in the whitening system «Opalescence Boost PF». After using these whitening systems, such a complication as hyperesthesia can rarely occur, the degree and frequency of which is more pronounced when using the «Magic Smile Pro system».

Key words: whitening system, hyperesthesia, «Opalescence Boost PF» and «Magic Smile Pro».

Connection of the publication with planned research works.

The study is a fragment of the SRW of the Poltava State Medical University «Differential approach to the selection of treatment methods depending on the morphofunctional features of the hard teeth tissues and tissues of the oral cavity», state registration number 0120U104124.

Introduction.

The modern rhythm of life dictates its own standards. One of the standards of the new time is a beautiful smile, and one of the main criteria for a beautiful smile is snow-white teeth without traces of dental plaque, pigments and plaque. Beautiful teeth have become an integral part of the image of a modern successful person, an indicator of their well-being and health [1].

Changing the color of teeth (discoloration) in people of different ages is a common lesion of the hard teeth tissues. Thus, according to G.I. Ron, the prevalence of persistent dental discolorations in the structure of dental morbidity is 14.8%, and the number of patients seeking treatment for their correction is 4.2%, which is 3.5 times lower than the prevalence of this type of disorder. According to S.Y. Maksiukov, dental discoloritis in young people is a fairly common pathological condition and occurs in 89% of cases. It has been noted that 56.6% of adolescents and young adults are not satisfied with the colour of their teeth, thus, modern youth are mostly motivated to have a lighter shade of enamel. This is in

line with the results of studies by other researchers who have shown that young people are concerned about the colour of their anterior teeth [2].

Recently, there has been a trend towards an increase in the number of patients who visit a dentist to change the appearance of their teeth, which suggests that teeth whitening is a highly relevant issue in modern dentistry [3].

The problem of teeth whitening associated with discoloritis arose more than 100 years ago. In their studies, many domestic and foreign authors emphasise the simplicity, safety and availability of whitening methods, while not focusing on the possibility of complications of this procedure [4, 5]. When performing in-office whitening, dentists most often face the following problems: unsatisfactory aesthetic results and increased tooth sensitivity [6]. Therefore, the search for whitening systems that do not have this disadvantage is ongoing.

The aim of the study.

To determine the comparative clinical efficacy of using the whitening systems «Opalescence boost» and «Magic Smile Pro» for whitening the vital teeth and to investigate hyperesthesia as the most common complication of this procedure.

Object and methods of research.

We performed in-office teeth whitening for 62 patients aged 25 to 40 years. The patients were divided into two groups of 31 people each. Patients in the first group were treated with the «Opalescence boost system», and patients in the second group were treated

with «Magic Smile Pro». Patients in both groups were randomized with respect to age, gender, etiological factors of discoloration and the degree of tooth staining. The causes of tooth discoloration in the subjects of both groups were exposure to coloring substances from food, drinks, tobacco and genetically determined yellow tooth color.

Patients were examined in accordance with generally accepted criteria. In addition, the color of the teeth was determined according to the standard «Vita Shade scale» before and after the whitening procedure. Before the whitening procedure, all patients had professional teeth cleaning.

The degree of hyperesthesia after the bleaching procedure was determined according to the classification of Y.A. Fedorov (1981). Further, for the diagnosis of dentin hyperesthesia, in accordance with the recommendations of Y.A. Fedorov (1997), the reaction to thermal, chemical and mechanical stimuli was determined in all patients. In order to objectify the degree of sensitivity of hard dental tissues, the index of intensity of dental hyperesthesia (IIHT) was used, which was calculated in points according to the formula: IIHT = sum of index values for each tooth/number of teeth with hyperesthesia. The value of the index for each individual tooth was determined according to the following rating scale: 1 score – the tooth tissues react only to temperature stimuli; 2 scores – the tooth tissues react to temperature and chemical stimuli; 3 scores – the tooth tissues react to all types of stimuli. Accordingly, if the IIHT value is from 1.0 to 1.5 scores, hyperesthesia of the first degree is diagnosed, if the IIHT value is from 1.6 to 2.2 scores, hyperesthesia of the second degree is diagnosed, and if the IIHT value is from 2.3 to 3 scores, hyperesthesia of the third degree is diagnosed.

In order to obtain more detailed information about the subjective feelings of patients and to objectify the data obtained, we used a verbal rating and a scale that allowed us to convert the subjective feelings of patients into conventional units (G.F. Biloklitskaya, 1996). No reaction to the stimulus – 0, weak reaction – 1, moderate reaction – 2, strong reaction – 3 conventional units.

To take into account the number of teeth affected by hyperesthesia, we used the prevalence index of dental hyperesthesia (PIDH) (Yu.A. Fedorov, V.A. Drozhzhina, 1997), which is calculated by the formula: PIDH = number of teeth with hyperesthesia/number of teeth in the patient x 100%. The diagnosis of generalized hyperesthesia was made if the PIDH was in the range of 26-100%, with the index value from 3.1 to 25%, a localised form of hyperesthesia was diagnosed.

Electroodontodiagnostics (EOD) was also used as an objective method of diagnosing hyperesthesia.

«Opalescence Boost PF» (Ultradent) is a strong whitening gel for professional use based on 40% hydrogen peroxide. «Opalescence Boost» is chemically activated by mixing the components of the system and does not require the use of a photopolymer lamp. The PF category provides for the presence of potassium nitrate and sodium fluoride, which are aimed at combating the main disadvantages of whitening, namely restoring the enamel structure, preventing hyperesthesia and protecting against caries. The advantages also include: easy activation and operation, no need for additional devices, consistency guarantees a clear application, whiten-

ing lasts for a day after the procedure, enamel can be lightened by 8-10 shades. Indications for use: whitening of teeth that have changed their color due to various diseases, including non-cariou lesions; whitening of teeth for aesthetic reasons, intracanal whitening of depulped teeth. Contraindications: hypersensitivity, gum disease, pregnant or breastfeeding women, patients under 13-14 years of age, allergy to hydrogen peroxide.

Method of application. After professional oral hygiene, it is necessary to protect the mucous membrane with a liquid cofferdam and apply the active gel to the vestibular surface of the front teeth, evenly distributing it over the entire surface. After 20 minutes, rinse the system off abundantly. After whitening, the surface was treated with fluoride polishing pastes to reduce tooth sensitivity, if any. The patient was advised to refrain from eating food containing natural dyes for at least a few days, not to eat, drink or smoke for one hour.

«Magic Smile Pro» whitening gel containing 44% carbamide peroxide. To reduce the sensitivity of the teeth, special anaesthetic ingredients have been added to the product, and a component has been added to the formula to provide contrast.

Method of application. First, professional oral hygiene was performed. Then, a lip holder and a bite template were used to protect the mucous membrane from the whitening gel. After that, a thin layer of liquid cofferdam was applied to the gums, and the vestibular surface of the teeth was carefully covered with the gel. The whitening lamp was brought into operation by setting the timer for 15-20 minutes of exposure, after which the lighting device was brought as close as possible to the surface of the teeth. After the first whitening cycle, the gel was thoroughly washed off the tooth surface. The procedure can be performed in 5 stages (identical algorithm of actions). It is recommended not to exceed the duration of the whitening procedure for more than 1 hour (60 minutes) in one session. The results of the study were processed according to the generally accepted method of variation statistics. The following were calculated: arithmetic mean (M), standard deviation (δ), and mean error of the arithmetic mean (m). The reliability of the results was assessed using the Student's t-test. The results were considered reliable when the probability coefficient was less than or equal to 0.05.

Research results and their discussion.

According to the universal scale «Vita Shade», patients of the first and second groups had the following initial tooth enamel colour: variant A (red-brown) was in 10 (32.3%) patients of the first group and 9 (29.0%) of the second group; variant B (reddish-yellow) was in 12 (38.7%) patients of the first group and 12 (38.7%) of the second group; variant C (grey) was in 9 (29.0%) patients of the first group and 10 (32.3%) of the second group.

After the whitening procedure, patients in the first group showed a change in enamel colour by an average of 8.22 ± 0.52 shades of the universal scale, and in patients in the second group – by 5.45 ± 0.43 ($P < 0.05$)).

It should be noted that reddish-yellow teeth (group B) and red-brown teeth (group A) were whitened most quickly and effectively in patients of both groups. The greatest problems arose when whitening grey teeth (group C) using both systems.

The number of whitening procedures for patients who used the «Opalescence Boost PF» whitening sys-

tem was on average 1.2 ± 0.15 , and for patients who used «Magic Smile Pro», on average 2.5 ± 0.55 , respectively ($P < 0.05$).

An excellent result of the whitening procedure was noted by 27 (87.1%) patients of the first group and 21 (67.7%) patients of the second group, a satisfactory result – by 4 (12.9%) patients of the first group and 8 (32.3%) patients of the second group, unsatisfactory results were not observed in both groups.

After the whitening procedure, the occurrence of hyperesthesia was noted in 8 (25.8%) patients of the first group and 12 (38.7%) patients of the second group. Accordingly, 4 (50.0%) patients of the first group and 6 (50.0%) of the second group had the first degree of hyperesthesia, 2 (25.0%) patients of the first group and 4 (33.3%) of the second group, and 2 (25.0%) and 2 (16.7%) patients of the third group, respectively. The values of EOD for patients of the first group were 3.2 ± 0.08 mKA, and for patients of the second group – 5.5 ± 0.09 mKA, respectively ($P < 0.05$).

The IHT for patients of the first group with hyperesthesia was 1.2 ± 0.8 , for the second group 1.9 ± 0.7 ($P < 0.05$), which indicates a more severe degree of hyperesthesia in patients of the second group. According to the verbal rating and the scale allowing to assess the subjective feelings of the patient (G.F. Biloklitskaya, 1996), in patients of the first group, the absence of a reaction to the stimulus (0 conventional units) was ob-

served in 23 (74.1%) patients, a weak reaction (1 conventional unit) was observed in 4 (12.9%) patients, a moderate reaction (2 conventional units) in 2 (6.5%) patients, a strong reaction (3 conventional units) – in 2 (6.5%) patients. In patients of the second group, the absence of a reaction to the stimulus (0 conventional units) was observed in 19 (61.3%) patients, a weak reaction (1 unit) was observed in 6 (19.3%) patients, a moderate reaction (2 conventional units) in 4 (12.9%) patients, a strong reaction (3 conventional units) – in 2 (6.5%) patients.

Index of IRHT for patients of the first group was 10 ± 0.9 , for patients of the second group – 15 ± 0.7 ($P < 0.05$), which indicates the presence of a predominantly localized form of hyperesthesia in patients of both groups.

Conclusions.

Thus, as a result of the study, we found that the whitening systems «Opalescence Boost PF» and «Magic Smile Pro» have sufficient clinical efficacy, which was more pronounced in the whitening system «Opalescence Boost PF». After using these whitening systems, such a complication as hyperesthesia can rarely occur, the degree and frequency of which is more pronounced when using the «Magic Smile Pro system». The advantages and disadvantages of these whitening systems should be taken into account when using them in practice.

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