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Comparative Assessment of the Whitening Toothpaste Effect on the Change in Color of the Dental Hard Tissues in Young Adults with Dental Discolorations.

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ABSTRACT

A dental discoloration is a change in color of the dental hard tissues due to pathological processes occurring in dental soft or hard tissues. Causes of discoloration are proved to be diverse. However, soft white dental plaque rapidly forming on teeth in case of poor oral hygiene is considered to be the major etiological factor of this process. The interest to esthetic issues in dentistry has been increasing recently. Discoloration results in deterioration of patient's appearance, and esthetics plays an important role in patients' desire to eliminate this disorder by conservative or operative interventions. The study investigates various whitening toothpaste effect on change in color of the dental hard tissues in young adults with discolorations.

Keywords: discoloration, change in color of the dental hard tissues, esthetic dentistry, whitening toothpastes.

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INTRODUCTION

The interest to esthetic issues in dentistry has been increasing recently. These issues include conservative methods of treatment, such as teeth whitening, as well as drastic treatment methods – veneers, crowns and restoration. Causes of discoloration are proved to be diverse. However, soft white dental plaque rapidly forming on teeth in case of poor oral hygiene is considered to be the major etiological factor of this process. Color pigments change the color of pellicle in constant impact of various dyes on the dental hard tissue. These pigments are present in coffee, tea, red wine, certain fruit, vegetables and juices, as well as carbonated beverages. Microorganisms and long-term use of certain medications may result in green color of dental plaque. Work in the occupational hazardous environment, such as cadmium production, production of iodine and bromide vapours, iron, nickel, mercuric chloride, mercury and lead processing may also result in dental discoloration. The tooth enamel can appear grey or brown as a result of genetic disorders: amelogenesis imperfecta, dentinogenesis, Stainton-Capdepont syndrome. “Tetracycline-stained” teeth appear to be manifestations of the systemic hypoplasia of the dental hard tissues that results in homogeneous yellow or grey tooth coloration without formation of strips, or apparent dark-grey coloration with strips formation.

Discoloration results in deterioration of patient’s appearance, and esthetics plays an important role in patients’ desire to eliminate this disorder by conservative or operative interventions.

The aim of this research is to study the various whitening toothpastes effect on change in color of the dental hard tissues in young adults with discolorations.

MATERIALS AND METHODS OF THE STUDY

The study included students of the Voronezh N.N. Burdenko State Medical University. 60 volunteers were selected from all the examined students; they gave their informed consent to participate in the study. They were divided into 4 groups depending on the interventions they applied:

- group 1 included 15 students that applied a toothpaste “Parodontol – triple action” (“Svoboda”, Russia);
- group 2 included 15 students who were administered a toothpaste “Novyzhemchug – whitening” (Russia);
- group 3 was composed of 15 students who applied a toothpaste “R.O.C.S. PRO – delicate whitening” (Russia);
- group 4 included 15 students who were recommended to apply a whitening toothpaste “BIOMED SUPERWHITE COMPLEX” (Russia).

Vitapan classical shade guide (Germany), which consists of 16 acrylic patterns with alphanumeric characters, was used to detect tooth color. Certain major details were taken into consideration when detecting patients’ tooth color:

- whether patients came to the procedure without bright make up and lipstick, since they disturb color perception in natural conditions;
- whether the color of patient’s clothes was light;
- tooth color was detected in natural lightening with indirect sunlight that provided sufficient intensity;
- interior décor of the room, where the examination procedure was performed, was of light shades;
- tooth color detection was performed during 6-7 seconds to exclude “fatigue effect” or “memory effect”.

To analyze detection of the average values of tooth colors, Vitapan classical shade guide was changed so, that each alphanumeric character had its own number, their location was set from lighter shades towards darker shades.

Tooth shade values from 1 to 6 corresponded to B1, A1, C1, B2, A2, D2; tooth shade values from 7 to 11 corresponded to A3, D3, D3, B3, D4, C2; significant coloration of darker tooth shade values from 12 to 16 on Vitapan classical shade guide corresponded to C3, B4, C4, A3,5, A4.

RESEARCH RESULTS

Students of group 1 were administered to apply a toothpaste “Parodontol – triple action” (Russia). The initial examination revealed a shade numerical value equal 12.47 (11.1; 13.41) units. Insignificant tooth whitening up to 12.1 (11.95; 13.07) units was revealed in a month after “Parodontol – triple action” application. An average value of the tooth color in young adults constituted 12.02 (11.08; 13.08) units in 3 months. In 6 months an average value of the tooth color in young adults was at the same level 12.06 (11.99; 13.21) units; this value did not differ from the previously specified one.

Students of group 2 applied a toothpaste “Novyzhemchug – whitening” (Russia). The initial examination of these students revealed a shade numerical value equal 13.12 (12.56; 13.82) units. Tooth color improved up to 10.26 (10.03; 10.97) units in 1 month after application of the recommended toothpaste. An average numerical value of the tooth color in young adults constituted 10.27 (9.96; 10.41) units in 3 months. In 6 months an average numerical value of the tooth color in young adults did not change and constituted 10.16 (10.0; 10.76) units.

Students of group 3 applied a toothpaste “R.O.C.S. PRO – delicate whitening” (Russia). The initial examination revealed a shade numerical value equal 13.01 (12.58; 13.77) units. A tooth shade numerical value constituted 7.11 (6.69; 7.52) units in 1 months after the beginning of investigations. An average numerical value of tooth color in young adults was 7.06 (6.71; 7.40) units in 3 months. The results assessed in 6 months after the beginning of investigations proved that a tooth shade numerical value of students did not change and constituted 7.1 (6.84; 7.37) units.

Students of group 4 applied a whitening toothpaste “BIOMED SUPERWHITE COMPLEX” (Russia). The initial examination revealed a shade numerical value equal 12.50 (11.64; 13.50) units. A tooth shade numerical value constituted 7.06 (6.84; 7.46) units in 1 months after the beginning of a whitening toothpaste “BIOMED SUPERWHITE COMPLEX” application. In 3 months an average numerical value of tooth shade in the examined young adults was 7.03 (6.71; 7.40) units. The results assessed in 6 months after the beginning of investigations proved that a tooth shade numerical value in students of group 4 did not change and constituted 7.01 (6.63; 7.34) units.

CONCLUSIONS

Therefore, the results obtained in this study supported the fact that the most significant positive changes of the dental hard tissues were observed in students of groups 3 and 4. They applied a toothpaste “R.O.C.S. PRO – delicate whitening” composed of hydroxyapatite having an evident remineralizing effect and papain able to split dental plaque, and a whitening toothpaste “BIOMED SUPERWHITE COMPLEX” composed of papain and bromelain, both providing removal of dental plaque, and Dissolvain and sodium bicarbonate cleaning components, having a polishing effect. In addition, combination of coconut oil, *cinnamon* extract and essential oils of *sage*, *rosemary*, *thyme*, *manuka* and *lemon* shell provides an antibacterial effect and pleasant spicy flavor. Moreover, calcium hydroxyapatite and L-arginine strengthen and restore dental enamel reducing tooth sensitivity. All the above mentioned allows recommending these toothpastes to improve oral hygiene care and safely whiten tooth enamel. However, it should be noted that the cost of a whitening toothpaste “BIOMED SUPERWHITE COMPLEX” is 3 times lower than that of “R.O.C.S. PRO – delicate whitening”; this fact is of great economic efficiency and especially actual for students.

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