



**CARIES IN SCHOOL CHILDREN AND TREATMENT
PREVENTIVE MEASURES**

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ABSTRACT	KEYWORDS
The prevalence and intensity of dental caries in children has decreased in many countries of the world over the past 20-30 years [1], and this phenomenon in the late XX and early XXI centuries coincided with the widespread introduction of systemic fluoridation programs.	

Introduction

The prevalence and intensity of dental caries in children has decreased in many countries of the world over the past 20-30 years [1], and this phenomenon in the late XX and early XXI centuries coincided with the widespread introduction of systemic fluoridation programs and the topical application of fluoride in the form of varnish, gel, and dentifrice countries This is consistent with the topical application of fluoride to the teeth in the form of particular note is fluoride-containing dentifrices, the consumption of which has increased by 29.7% worldwide, 45.4% in Western Europe, and 90.6% in Eastern Europe since 2000 [2]. Recognizing the fact that the decline in dental caries coincides with the increase in consumption of fluoridated dentifrice in general, one must realize that the impact of global fluoridation of dentifrice on the population of Eastern Europe and Russia is negligible. In Uzbekistan, the average citizen consumes about 300 ml of toothpaste per year (G. N. Pakhomov, 2006). The average permanent tooth index KPU (indicating the number of carious, filled, and extracted teeth per capita) for 12-year-old children living in Uzbekistan is 2.5. A similar trend is observed in the CIS countries [3], which is about twice as high as in the U.S. and 2.6 times as high as in Germany [4]. The above data indicate that overall fluoridation of toothpaste does not adequately solve the problem of dental caries. One possible reason for the inadequate caries-preventive effect of hygiene products may lie in a formalistic attitude toward oral hygiene and a lack of awareness that oral hygiene is an important factor in preventing not only dental diseases but also exacerbations of so-called seasonal infections and chronic diseases. On the other hand, modern medicine confirms this relationship. Regular and thorough oral care leads to a decrease in the frequency of common diseases, especially colds and allergies [5]. There is a wide variety of oral hygiene products on the market today. Their advantages and disadvantages are widely discussed in the media and professional journals. However, little attention has been paid to their correct use. For example, it is known that the average

time for brushing teeth takes at least two to three minutes. However, according to a dating study, most people (about 90%) brush their teeth for only 25-40 seconds [5]. This amount of time does not allow time for the many active ingredients in hygiene products to exert their proper effects. For example, the widely used sodium fluoride begins to "act" only 60 seconds after the start of brushing [6]. Plaque and debris remain on the lingual, palatal, and masticatory surfaces of the teeth [5]. This makes it even more difficult for the active substance to penetrate the tooth surfaces, which undoubtedly affects its caries-preventive effect. The purpose of this study was to clinically evaluate the caries-preventive efficacy of three commercial toothpastes formulated with different active substances (fluoride-free mineralized complex, AmF, and NaF) and to determine that the effectiveness of these hygiene products depends on conscientious implementation of preventive measures.

Patients and Methods As part of the implementation of this study, a secondary school² in Surkhandariya, where a prevention program has been in place for 10 years and the school administration actively supports and manages its implementation, was selected. All children in grades 1 and 2 aged 7 to 8 years (mean age 7.4 years) were given brushing instruction with the consent of their parents or guardians. After the primary dental examinations conducted as part of the planned annual preventive examinations, first- and second-grade children aged 7 to 8 years were divided into three equal groups according to the initial dental status index (index values are shown in the table): group A included 90 children (mean age 7.3 years), group B included 69 children (mean age 7.5 years), group C Group A had 109 subjects (mean age 7.4 years); Group B had the active ingredient "Mineralin" without fluoride (R.O.C.S. Kids "Fruit Horn"); Group A had the active ingredient AmF, 500ppm F- (R.O.C.S. Kids "Raspberry Strawberry"); Group B had the active ingredient NaF, 1000 ppm F- (Colgate Looney Tunes Toothpaste). All these toothpastes are registered and approved for use in the Republic of Uzbekistan. As a control group, 99 7- to 8-year-old elementary school students from another school in Minsk were studied as the "G" group. In this group, there was no active intervention in oral hygiene regimen in the form of brushing management. All children in the "G" group were subject to hygiene programs and dental health lessons. The children's (parents') choice of toothpaste, regularity and quality of tooth brushing in the "G" group were not controlled, but considering the structure of the toothpaste market in the Republic of Belarus, it is likely that children in the control group mainly used fluoride toothpaste; groups of children in "A", "B" and "C" were organized on the day of the school visit, tooth brushing under the supervision of the teacher, mirror, washbasin, and hot water, and was carried out after lunch in a specially equipped room with hot water. The teacher applied 1 ml (or 0.5 cm layer thickness) of the test toothpaste directly to the children's toothbrushes, brushed for 3 minutes, and provided help as needed. Children's participation in the school toothbrushing instruction program was carried out under appropriate hygienic conditions, in agreement with their parents, and within the framework of the "National Program for the Prevention of Dental Caries and Periodontal Disease in Uzbekistan," approved by the Ministry of Health of the Republic of Uzbekistan in 1998. The dental status examination was conducted in school dental clinics under standard conditions of lighting, use of instruments, and recording of data. Prior to the start of the program, the oral hygiene index "OHI-S" (Green-Vermillion, 1964), the gingival index "GI" (Loe-Silness, 1963), and the KPU index, which reflects the intensity of caries in permanent teeth, were measured during dental examinations of the children. The researchers did not know what toothpaste was used by the children in the "A", "B," and "C" groups. Retests for this study were conducted 24 months after the program began.

Results and Discussion:

Eighty-three elementary school students (out of 90) from Study Group "A," 61 (out of 69) from Study Group "B," 94 (out of 109) from Study Group "C," and 57 (out of 99) from Control Group "G" completed the two-year school-based toothbrushing management program. Dropout of program participants was due to relocation, change of school, or prolonged absence from school. In no case did a child or parent refuse to participate in the school tooth cleaning program. School administrators and teachers were highly interested in implementing the Dental Health Program. Examination results showed that the oral hygiene of the 7- to 8-year-old children prior to the start of the program was rated "unsatisfactory," with a mean OHI-S hygiene index ranging from 1.6 to 1.7 units. The mean gingival GI was 0.8, indicating mild gingivitis; 22.5% of the children had permanent dental caries; the mean KPU score for the four groups ranged from 0.41 to 0.51 ($p > 0.05$). By the end of the 2-year brushing instruction program for clinical groups A, B, and C, oral hygiene scores improved by 40-44% from baseline (OHI-S), so that children in the program moved from "unsatisfactory" to "satisfactory" in terms of oral hygiene. Concurrent with the improvement in children's oral hygiene levels, an average 30% reduction in the gingival index "GI" was observed, which is close to the actual potential for gingivitis prevention in a group oral hygiene program. The difference between the oral hygiene index and gingival status in the studied group of children was not statistically significant ($p > 0.05$). This paper analyzes the changes in caries intensity of permanent teeth based on the KPU index in children of the study groups "A", "B" and "C" compared to the control group "D." In group "A", where children in grades 1 and 2 performed oral hygiene using a fluoride-free children's toothpaste, the KPU of permanent teeth (initially 0.41 ± 0.08) increased by 0.52 by the end of the second year of control brushing, with a KPU of 0.93 ± 0.15 ($p < 0.05$). In group "B" with children's toothpaste containing the active ingredient AmF (500 ppm F⁻), the initial KPU of 0.49 ± 0.10 increased by 0.53 KPU to 1.02 ± 0.15 by the end of the program ($p < 0.05$). In group "B", where the teeth were brushed with a paste containing the active ingredient NaF (1000 ppm F⁻), the initial KPU of the teeth 0.51 ± 0.09 increased to 0.99 ± 0.12 over the two years of the program ($p < 0.05$). There was no statistically significant difference between the final KPU values of the permanent teeth of groups "A", "B" and "C" were not (see Table), suggesting that these toothpastes are the same in their effect on the caries strength index of permanent teeth in the lower grades. To examine the medical effects of toothpaste in the prevention of dental caries, we compared the KPU values (increase in KPU over 2 years) in groups "A", "B," and "C" with a passive control ("G" group) that does not intervene in the daily oral hygiene of school children. The increase in caries intensity of permanent teeth in this group of children was 1.01 KPU: from 0.43 ± 0.12 to 1.44 ± 0.14 over 24 months of observation ($p < 0.01$). Comparative evaluation of mean KPU values between groups "A", "B" and "C" and group "G" showed that over the 2-year observation period, the "A" group (mineralin) had 49 %, 48% in the "B" group (AmF), and 52% in the "C" group (NaF), and KPU growth decreased. According to the KPU values at the end of the program, the difference between the "passive" control group and the control brushing group was significant ($p < 0.05$). There were no significant differences in the final KPU between the "A", "B" and "C" groups (see table). It was important to compare the data obtained with the results of a similar program with a larger number of children, which only included first graders aged 6-7 years [7]. The three commercial toothpaste samples containing various active substances showed a similar trend in terms of reducing the increase in the caries intensity of permanent teeth, suggesting that the results obtained were reliable (Fig.) However, in the previous program, the caries-preventive effect of the

same dentifrice was somewhat lower (within 30%). This difference is due to the different levels of motivation and discipline of the participants in the ongoing prevention programs. In the first case, the "dental health program" was implemented in nine schools, most of whose teachers and administrators were new to such programs, which had a significant impact on discipline and general atmosphere (in most cases, they were skeptical). In the second case, schools implementing preventive programs were selected as schools where such a program had been in place for about 10 years, all teachers were well trained, and the school administration was interested in improving the dental status of students.

Conclusions:

Results of a long-term randomized, blinded clinical trial showed that all three commercial toothpaste samples with different active ingredients were highly effective in preventing permanent tooth decay in elementary school children (7-8 years old) who participated in a teacher-supervised toothbrushing program at school. reduction in permanent tooth growth over 2 years in 7-8 year olds, 49% with non-fluoride mineralized toothpaste, which was comparable to the medical effectiveness of toothpastes containing minimal concentrations of amino fluoride (500 ppm F-) or conventional sodium fluoride (1000 ppm F-) in the prevention of dental caries. Since this study showed no significant difference in the efficacy of fluoride-free mineralin-containing dentifrice, americium fluoride-containing dentifrice, and sodium fluoride-containing dentifrice, mineralin-containing dentifrice with the active ingredient "mineralin" is comparable to well-known fluoride-containing oral hygiene products as a topical caries It can be recommended as a caries-preventive measure on par with well-known fluoride-containing oral hygiene products. The caries-preventive effect of toothpastes depends not only on the active ingredient in the toothpaste, but also on the regularity and accuracy of brushing.

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