Preventive Measures in the Treatment of Caries in School children

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ABSTRACT

In many countries of the world in the last 20–30 years, there has been a decrease in the prevalence and intensity of dental caries in children [1]. This phenomenon of the late XX - early XXI century coincides with the widespread introduction of systemic fluoridation programs (USA, Germany, France, etc.) and local application of fluoride to teeth in the form of varnishes, gels and toothpastes (Scandinavian and Baltic countries). Of particular note are fluoride-containing toothpastes, whose consumption has increased by 29.7% since 2000 in the world, by 45.4% in Western Europe, and by 90.6% in Eastern Europe [2]. Recognizing the fact that the decrease in the intensity of carious disease coincides with the increase in the consumption of fluoride-containing toothpastes in general, one cannot but notice the minimal effect of global fluoridation of toothpastes on the inhabitants of Eastern Europe and Russia. In Uzbekistan, the average citizen annually consumes about 300 ml of toothpaste (G. N. Pakhomov, 2006). However, the medical effect of this method of prevention of dental caries is small: the average index of the permanent teeth KPU (reflecting the number of carious, filled and extracted teeth in one individual) in 12-year-old children living in the territory of the Uzbekistan is 2.5. Similar dynamics is observed in the CIS countries [3], which is about 2 times higher than in the USA and 2.6 times higher than in Germany [4]. From the above data it follows that the total fluoridation of toothpastes does not solve the problem of dental caries properly. One of the possible reasons for the insufficient anti-carious effectiveness of hygiene products may be a formal attitude to oral hygiene and the lack of perception of it as an important factor in prevention, not only of dental diseases, but also of the so-called seasonal infections, exacerbations of chronic diseases. Meanwhile, modern medicine has confirmed this connection. Regular and thorough oral care leads to a decrease in the frequency of common diseases, especially colds and allergies [5].

Keywords:

Currently, there are a wide variety of oral hygiene products on the market. In the media, as well as in the professional press, their advantages or disadvantages are widely discussed. Much less attention has been paid to their correct use, although the conscientious implementation of the recommendations laid down by the manufacturer makes a significant contribution to increasing the effectiveness of a particular tool. So, for example, it is known that the average time of brushing your teeth should take at least 2-3 minutes. However, according to chronometric studies, most people (about 90%) brush their teeth for only 25–40 seconds [5]. During such a period of time, many active components of hygiene products do not have

time to have the proper effect. An example is the widely used sodium fluoride, which begins to "work" only 60 seconds after the start of brushing the teeth [6]. The results of cleaning the oral cavity are also very often unsatisfactory: dental plaque, food debris remain on the lingual, palatine and chewing surfaces of the teeth [5]. This creates additional difficulties in the penetration of active substances to the tooth surface, which undoubtedly affects their anti-caries effectiveness. The aim of this work was to clinically evaluate the anti-caries efficacy of three commercial samples of toothpastes with various active substances (fluoride-free mineralizing complex, AmF and NaF) and to identify the dependence of the effectiveness of these hygiene products on the conscientiousness of the implementation of preventive measures.

Patients and methods: As part of the implementation of this study, a secondary school 2 was chosen in the city of Surkhandarya, where preventive programs have been carried out for 10 years, and the school administration actively supports and controls their implementation. All children in grades 1 and 2 aged 7–8 years (mean age 7.4 years) were involved in the supervised brushing program with parental consent. After the primary dental examination, carried out as part of the planned annual preventive examinations, children of the 1st and 2nd grades at the age of 7–8 years were divided into 3 equal groups in accordance with the initial dental status indices (index values are indicated in the table). There were 90 schoolchildren in group A (mean age 7.3 years), in group B - 69 (mean age 7.5 years), in group C - 109 (mean age 7.4 years). For the entire period of the program, the schoolchildren included in the study were provided with children's toothpastes: in group "A" - the active ingredient "Mineralin", without fluorine (R.O.C.S. Kids "Fruit Horn"); in group "B" - the active component AmF, 500 ppm F- (R.O.C.S. Kids "Raspberry-Strawberry"); in group "B" - the active component NaF, 1000 ppm F- (Colgate Looney Tunes toothpaste). All of these toothpastes are registered and approved for use in the Republic of Uzbekistan. As a control group, the study included 99 schoolchildren from another school in Minsk aged 7–8 years, united in the “G” group. In this group, there was no active intervention in the regimen of oral hygiene in the form of controlled brushing. All children included in group "G" were covered by the sanitation program and dental health lessons. The choice of toothpastes by children (parents), the regularity and quality of brushing teeth in the “G” group were not controlled, however, given the structure of the toothpaste market in the Republic of Belarus, it can be assumed that children in the control group mainly used fluoride-containing toothpastes. For groups of children "A", "B" and "C" on the days of school visits, toothbrushing was organized under the supervision of teachers, which was carried out after lunch in a specially equipped room with mirrors, sinks and warm water. Teachers dispensed the study toothpaste by applying it directly to the child's individual toothbrush in a volume approximately equal to 1 ml (or a layer thickness of 0.5 cm), followed the brushing procedure for 3 minutes, and helped if necessary. The participation of children in the school program of supervised brushing of teeth was agreed with parents, carried out in proper sanitary conditions and was carried out within the framework of the National Program for the Prevention of Dental Caries and Periodontal Diseases in Uzbekistan, approved by the Ministry of Health of the Republic of Uzbekistan in 1998. The study of dental status was carried out in school dental offices in standard conditions for lighting, instrument use and data logging. Before the start of the program, during the dental examination of children, the oral hygiene index “OHI-S” (Green-Vermillion, 1964), the gingival index “GI” (Loe-Silness, 1963) and the KPU index, reflecting the intensity of caries in permanent teeth, were determined. The researcher did not know what toothpastes were used by children in the study groups of children "A", "B" and "C". A re-examination for the purpose of this study was carried out 24 months after the start of the program. The results of the study were processed statistically in the Excel

statistics program with the definition of average values and Student's criteria "t" and "p".

Results of the research and their discussion:
83 schoolchildren (out of 90) of the study group "A", 61 schoolchildren (out of 69) of the study group "B", 94 schoolchildren (out of 109) of the study group "C" completed a full two-year program of controlled brushing of teeth in schools and 57 schoolchildren (out of 99) of the control group "G". The dropout of program participants was due to a change of residence and (or) school and a long absence from school. There were no cases of children or their parents refusing to participate in the dental cleaning program in schools. The school administration and teachers were highly interested in running a "dental health program". According to the results of the examination, before the start of the program, the oral hygiene of 7-8-year-old children was assessed as "unsatisfactory" - the average OHI-S hygiene index was in the range of 1.6-1.7 units. The mean gingival GI was 0.8, indicating that the children had mild gingivitis. In 22.5% of children caries of permanent teeth was revealed. Mean KPU scores in the four groups ranged from 0.41 to 0.51 ($p > 0.05$). By the end of the 2-year supervised brushing program in clinical groups A, B, and C, oral hygiene scores had improved by 40–44% from baseline (OHI-S) and thus children, participants in the program moved from “unsatisfactory” to “satisfactory” in terms of oral hygiene. Simultaneously with the improvement in the level of oral hygiene in children, a decrease in the gingival index "GI" by an average of 30% was observed, which is close to the real possibilities of preventing gingivitis in mass oral hygiene programs. Differences in indicators of oral hygiene and the state of the gums in the studied groups of children were not statistically significant ($p > 0.05$). This paper analyzes the change in the intensity of caries in permanent teeth according to the KPU index in children of the studied groups "A", "B", "C" in comparison with the control group "D". In group "A", where schoolchildren of grades 1-2 used mineralizing children's toothpaste without fluorine for oral hygiene, the KPU of permanent teeth (initially 0.41 ± 0.08) increased by 0.52 by the end of the 2nd year of controlled brushing KPU to the level of 0.93 ± 0.15 ($p < 0.05$). In group "B" in children who used children's toothpaste with the active ingredient AmF (500 ppm F-), the initial KPU 0.49 ± 0.10 increased by 0.53 KPU by the end of the program to a level of 1.02 ± 0.15 ($p < 0.05$). In group "B", where children brushed their teeth with a paste with the active ingredient NaF (1000 ppm F-), the initial KPU of teeth 0.51 ± 0.09 increased to 0.99 ± 0.12 over 2 years of the program ($p < 0.05$). There were no statistically significant differences between the final values of the KPU of permanent teeth in groups "A", "B" and "C" (see table), which gives reason to consider these toothpastes the same in their effect on caries intensity indicators of permanent teeth in younger ones. schoolchildren. To determine the medical effectiveness of the studied toothpastes in the prevention of dental caries, a comparison was made of the KPU values (increase in KPU for 2 years) in groups "A", "B" and "C" with passive control, where there was no intervention in the routine oral hygiene of schoolchildren (group "G"). The increase in the intensity of caries in permanent teeth in children of this group was 1.01 KPU: from 0.43 ± 0.12 to 1.44 ± 0.14 over 24 months of observation ($p < 0.01$). In a comparative assessment of the values of the average KPU in groups "A", "B", "C" with the group "G", it was possible to establish a decrease in the growth of KPU over a 2-year observation period in group "A" (Mineralin) by 49%, in the group " B" (AmF) by 48% and in group "C" (NaF) by 52%. Differences between the "passive" control group and the groups of controlled brushing, according to the values of the KPU at the end of the program, are significant ($p < 0.05$). There were no significant differences in the final KPU between groups "A", "B", "C" (see table), which indicates approximately the same, within 50%, anti-caries effect of the studied toothpastes. It was important to compare the obtained data with the results of a similar program that covered a significantly larger number of children, but only the first grades at the age of 6–7 years [7]. There is a similar trend in reducing the increase in the intensity of caries in permanent teeth when using all three commercial samples of toothpastes with various

active substances, which suggests a high reliability of the results obtained (Fig.). However, the anti-caries effect of the same toothpastes in the previous program is 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 implementation of the "program of dental health" was carried out in 9 schools, teachers and administration of most of which participated in such a program for the first time, which significantly affected the discipline and general mood (in most cases - skeptical). In the second case, a school was chosen to carry out the preventive program, where such programs have been implemented for about 10 years, all teachers are well trained, and the school administration is interested in improving the dental status of schoolchildren.

Conclusions: 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 primary school-age children (7–8 years old) who participated in a teacher-supervised supervised toothbrushing program at school. . The decrease in the growth of permanent teeth in children 7–8 years old for two years was 49% for mineralizing toothpaste without fluoride, which is comparable to the medical effect in the prevention of dental caries of pastes containing minimal concentrations of aminofluoride (500 ppm F-) or conventional sodium fluoride (1000 ppm F-). There were no significant differences between the effectiveness of mineralizing toothpaste without fluoride, with AmF and NaF in this study, which gives reason to recommend mineralizing toothpastes with the active ingredient "Mineralin" as an equivalent means of local prevention of dental caries along with well-known fluorine-containing products for oral hygiene. The anti-caries effectiveness of toothpastes depends not only on the active components contained in them, but also on the regularity and correctness of the technique of brushing teeth.

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