PREVENTION OF DENTAL CARIES WITH THE METHOD OF FLUORINATION OF MILK PRODUCTS


Tashkent State Medical Institute of Dentistry, Republic of Uzbekistan.

Abstract. The prevalence of noncommunicable diseases is significant in various countries of the world. They pose a complex burden on people and society, reflect significant differences between countries, affect the poor and disadvantaged groups unequally, and progress rapidly.

Keywords. circulating fluids, dentin, enamel, mechanism, dental caries, mineralized, toothpastes.

Fluorine makes up 0.065% of all elements of the earth's crust and is an important component of the overall biogeochemical cycle. In the domestic scientific literature, the concept of "fluorine" is often found, but it should be borne in mind that the drugs used for the prevention of dental caries are not chemically pure fluorine, but its compounds - fluorides, where this element is contained in the form of a fluorine ion, bound with any cation. When studying the metabolism of fluoride in the human body, it turned out that fluorine compounds have an affinity for the minerals from which bones and teeth are built. (1) The accumulation of such compounds occurs in those areas of mineralized tissues that are in contact with circulating fluids. The content of fluoride is higher in the surface layers of the enamel and decreases in the deeper layers, while it is not detected in the organic matrix of enamel and dentin. In the area of the incisal edge of the chewing surface of the teeth, the concentration of fluoride is significantly higher than in the area of the neck. This phenomenon is probably due to the fact that the incisal edge is formed first, develops and mineralizes for a longer time, as a result of which it absorbs more fluoride. Temporary teeth are characterized by a lower concentration of fluoride than permanent teeth. With age, the concentration of fluoride in permanent teeth decreases, which is probably due to the gradual wear of the enamel. In unstimulated saliva, trace fluoride concentrations are determined (about 1 μmol/L or 0.019 ppm), which corresponds to about 1/50 of the optimal fluoride value in drinking water (1 ppm). In stimulated saliva, the fluoride content is slightly higher - from 0.5 to 5 μmol/L (0.01-0.1 ppm). The concentration of fluoride in dental plaque ranges from 4 to 50-60 ppm. (3) Moreover, most of it is bound and only a small amount is in the ionic form. The liquid phase of plaque can contain 10 times more fluoride than saliva. It would seem that it can be a reservoir...
of fluoride, but the negative effect of plaque on the enamel is much higher, so it must be carefully removed. Among them, diseases of the oral cavity remain the most common, in contrast to other chronic diseases [13,15]. Dental care is the most expensive for people and society as a whole [14], in the countries of the European Union, the cost of treatment, mainly for dental caries, in 2011 amounted to about 79 billion euros [12]. Currently, the literature contains convincing data on the mechanism of dental caries, the main causes of which are fluoride deficiency, the accumulation of aggressive plaque on the teeth and an inadequate diet due to excessive and frequent consumption of sugar-containing food. In recent years, in our country, due to the increasing consumption of fluoride-containing toothpastes, there has been a tendency to improve the condition of permanent teeth in the child population (Avraamova O.G., Leontyev V.K., 1998; Kiselnikova L.P., 2007).

At the same time, data from both domestic and foreign literature (4) indicate that the prevalence of decay teeth caries remains at an unacceptably high level, including among children of economically developed Western countries. Of particular concern is Early Childhood Caries (EEC). A disdainful attitude towards the developed caries of milk teeth and its complications can lead to the development of an inflammatory process in the periodontium and to pathological changes in the rudiments of permanent teeth (Poulsen S. et al., 2002). In this case, not only a violation of the formation of tissues of permanent teeth, but also a displacement of their primordia with subsequent abnormal eruption is possible.

Countries in Eastern Europe have not yet reached the WHO regional goals for pediatric dental health by 2000, namely: over 50% of 6-year-olds should have intact teeth, while for 12-year-olds the average CFE index should not exceed 2.0. Thus, the effective implementation of prevention programs is extremely necessary in accordance with the WHO goals in achieving dental health by 2020: over 80% of 6-year-old children should have intact teeth, while in 12-year-olds the average value of the KPU index should not exceed 1.5 [14]. However, at present, many of these countries have problems associated with dietary habits and the lack of adequate fluoride prophylaxis of dental caries [11]. In addition, in conditions of limited availability of dental care, professional topical fluoride applications may not be effective enough to prevent and control dental caries. In this regard, systemic methods of fluoride prophylaxis (fluoridation of drinking water, fluoridated milk intake by children, fluoridation of salt), in addition to the use of fluoride-containing toothpastes, may be the best solution to the problem of preventing dental diseases [6].

Fluoridation of milk, as an alternative to water fluoridation, is one of the
strategies in the field of communal programs for the prevention of dental caries [3]. The use of milk, as an important component of a child's nutrition, can be effectively integrated into school prevention programs focused on maintaining a healthy lifestyle.

The most important measure for preserving temporary teeth until the period of their natural replacement with permanent ones is the primary prevention of dental caries. It should be built at the communal and individual levels (13). Our epidemiological studies have shown that, due to certain circumstances, the prevalence of dental caries among the pediatric population of St.

The problem of high dental morbidity in children and adolescents in Russia remains one of the most acute and urgent problems that pose a real threat to their health.

In the Russian Federation, dental caries is detected in children as young as two years old. The intensity of caries of deciduous teeth in children of two to three years is equal to 0.45 and 2.45, respectively. Children with intact (healthy) teeth at the age of 15 in the Russian Federation account for 12%. Diseases of the teeth are often the cause of diseases of the joints, kidneys, heart.

The existing pronounced age-related dynamics of indicators of the prevalence and intensity of caries of permanent teeth in school-age children (7-15 years old) shows that the prevalence of caries of permanent teeth increases from 59.05% at 7 years to 98% at 15 years.

Fluoride, a microelement present in very small quantities in food and drinking water, plays a special role in the prevention of caries.

Fluoride strengthens the structure of the enamel of the teeth, providing its mineral nutrition, restores the lime content, reduced by the action of bacteria acids. During the establishment of permanent teeth, fluoride affects the structure of the coronal part of the tooth, smoothing the fissures. Fluoride protects teeth from decay even when chewing nuts, crackers, etc. However, an overdose of fluoride leads to softening of the enamel and the appearance of white spots on the teeth.

At the same time, the use of fluorides for the prevention of dental diseases still causes lively discussions, despite the fact that the use of artificially fluorinated drinking water with a fluoride concentration of 1 mg / l for this purpose is not associated with negative consequences for humans.

A number of researchers suggest that the "optimal" intake of fluoride per day ranges between 0.05 and 0.07 mg per kg of body weight. To avoid the appearance of dental and bone fluorosis, the total intake of fluoride per day should not exceed 0.1 mg / kg of body weight. Experts at the US National Academy of Sciences believe that a safe dose is to take 1.5 to 4 mg of fluoride per day.(7)
On the recommendation of the World Health Organization, in case of insufficient fluoride content in drinking water, in most countries of Europe, Asia and America, fluoridation of water, food, milk or fluoride preparations is taken internally.

Milk is the most common and indispensable product in the diet of children, which is characterized by high levels of calcium and phosphorus, and also contains lactose, which breaks down carbohydrates. Its enrichment with fluorides is the most effective method of preventing dental caries in children. Thanks to this composition, milk participates in the process of remineralization of tooth enamel and its protection.

Fluoridated milk is produced pasteurized and sterilized. Boiling does not affect the preventive properties of milk. For fluorination, sodium fluoride is often used, less often sodium monofluorophosphate. Their addition does not change the organoleptic properties of milk and remains in an active form, which determines its preventive effect on the crystal structure of enamel and the environment of the oral cavity.

When determining the amount of fluoride to add to milk, it is necessary to take into account the age of the child and the intake of fluoride from other foods and water. So, based on the WHO recommendations, for children from 3 to 7 years old, the daily intake of fluoride is 0.87-1.75 mg. (10)

The optimal concentration of fluoride in milk for preschool children is 2.5 mg/l. It provides a daily total intake of 1.0-1.15 mg of fluoride per day.

The physiological level of the daily intake of fluoride in the child's body should be strictly monitored by medical workers using the method of excreting fluoride in the urine.

The Research Institute of Baby Food of the Russian Academy of Agricultural Sciences has developed technological documentation for drinking pasteurized milk for children, fluorinated with a mass fraction of fat 3.2% "Snow White". The product is made from natural or reconstituted milk, homogenized and pasteurized.

The fluoride content in milk is determined potentiometric using an ion-selective electrode. The technique is applicable to the determination of fluorides in dry milk products for baby food in the concentration range of 8-50 mg/kg and in liquid milk products 2-20 mg/kg. The technology of milk fluoridation is simple and does not present any particular difficulties.

Fluoridated milk is intended for feeding children over 3 years old in organized children's groups in regions where there is a shortage of fluoride. The recommended daily intake of the product is no more than 200 ml. As consumer packaging, bags made of polyethylene film are used, as well as bags made of combined packaging material for food products. The shelf life of pasteurized milk
Fluoridated milk is widely used. In Tashkent, the method of milk fluoridation, and already in September 2002, the production of fluoridated milk was established and its delivery to the city's kindergartens was organized. Currently, 11 thousand children in Tashkent drink fluoridated milk. In July 2004, the Zelenodolsk dairy plant began producing fluoridated milk, supplying it to city kindergartens and retail chains. Thus, thanks to the implementation of the approved republican target program "Prevention of dental diseases in the Republic of Uzbekistan for 2006-2008" in record time (5-6 months), it was possible to introduce a milk fluoridation project.

Fluoridation of water as a communal prevention method has many advantages; however, if it is impossible to carry out it, a good alternative is the consumption of fluoridated milk or salt [6,9]. The method of fluoridation of milk requires a clear functioning of the program for its admission by children in preschool and school institutions [8].

References