

Stomatological assistance to children with dental fluorosis in the Republic of Moldova

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Summary

According to the requirements of WHO, 1095 children of 6,12 and 15 years old from 10 localities were inspected, 887 of which lived in 8 localities with a content of fluoride in drinking water exceeding 1.5 mg/l. Prevalence and severity of dental fluorosis in children were accordingly: at 6 years of age - 81.77% and 1.73 ± 0.53 ; at 12 years - 82.57% and 2.22 ± 0.47 ; at 15 years- 89.87% and 2.24 ± 0.77 . The risk factors of origin of dental fluorosis in children were defined, according to which the measures of primary preventive maintenance were offered. The clinical evaluation of treatment methods of dental fluorosis in children, with application of bleaching and microhybrid composites, was performed.

The problems of stomatological diseases among children living in areas with high concentration of fluoride (F) in drinking water has attracted researchers' attention due to high frequency of fluorosis, of clinical peculiarities of other stomatological diseases, lack of common criteria of ascertaining of fluorosis, insufficient methods of perception and treatment of disease used in different countries of the world [6, 7, 15].

The condition of oral cavity of children living in areas with high concentration of F in drinking water concerned many researchers, including those of Republic of Moldova [16, 13, 18]. However, till present in practical studies in our republic the criteria of defining oral cavity condition (accepted only in several of post-Soviet countries) are used.

Data analysis allows maintaining an opinion that certain clinical-epidemiological aspects of dental fluorosis have not achieved up-to-date level in solving the problem; not all the mechanisms of F action, and factors of risk of fluorosis have been ascertained, there are no unified criteria of ascertaining the fluorosis, effective methods of prevention and treatment of dental fluorosis are lacking. Because of the fact that there are a lot of areas in our republic where the amount of F in drinking water is higher than optimal, the frequency of morbidity with dental fluorosis among population including children is high [13, 17]. At the same time, the clinical characteristics of such diseases in these endemic areas are not fully studied, and the efficiency of traditional methods of prevention and treatment

are insufficient. All of that confirms the topicality of our investigation.

Materials and methods

1095 children from 10 areas of North, Central and Southern Moldova were examined, 887 of the children are from 8 areas, where the amount of F in drinking water exceeds the permissible norm (1.5 mg/l). According to World Health Organization (WHO) recommendation on age groups, the following groups of children were examined: 6 year-old - 495 children, 12 year-old - 483 children and 15 year-old - 117 children.

Among the examined groups, the amount of girls was insignificantly higher - 547 (52.42%) girls and 521 (47.58%) boys.

The data of examined children were recorded in WHO ORAL HEALTH ASSESSMENT FORM (1986) - the format of medical card was proposed by WHO. Standard codes of WHO were used to fill in all the parts of the medical forms.

The method of ascertaining the fluorosis was worked out according to WHO criteria and recommendation (1997); these criteria were additionally determined for each tooth in particular.

Risk factors for dental fluorosis were established on the basis of questionnaires and medical records of children.

In the diagnosis of dental fluorosis halogenic lamp in blue and green light was used.

In the treatment of children with fluorosis the proposed methods of depigmentation and restauration of teeth with the use of composite microhybrid materials were applied. For clinical research of the proposed methods the demands of FDI on composite materials for front teeth were used.

Results and discussions

According to the analysis of examined data the frequency of dental fluorosis among children living in areas with high amount of F in drinking water makes up 82.84%, which is lower than that determined by B. Rusnac in 1965 (52.6%). Among 6 year-old children the frequency of dental fluorosis was 81.77%; among 12 year-old children it was 82.57% and among 15 year-old children-89.87%.

Medium grade of affection by fluorosis consists in 2.01 ± 0.33 :

- in 6 year-old children - 1.73 ± 0.53 ;
- in 12 year-old children - 2.22 ± 0.47 ;
- in 15 year-old children - 2.24 ± 0.77 .

The received data correspond with those of other investigators in different countries: Weeks KJ. et al., 1993; ГнистоК FIJI, et al., 1993; Mella S. et al., 1994; МННСНН О.В. et al., 1999; А.В.АЖММСКНН, 2000.

Analyzed data show that the frequency of dental fluorosis evidently increases at age 12 to 15, while the intensity of fluorosis increases at age from 6 to 12.

It can be explained by the fact that in the period 6 to 12 years old teeth affected by fluorosis erupt (incisive and Ist molars), and at the age of 12 premolars and canines erupt, teeth that are less exposed to fluorosis (*Figure 1*).

The study of frequency and intensity of dental fluorosis affection among children of different locations in dependence of the amount of F has demonstrated that together with the level of F concentration in drinking water the frequency and intensity of dental fluorosis affection grows (*Figure 2*),

However, the analyzed data in some locations have also highlighted some controversial data: in some areas with an increase of F concentration in drinking water the frequency and intensity of fluorosis among children from some areas did not increase; on the contrary, it decreased. It can be explained by the influence of

some factors, of general and local character, which influenced children's organism:

- in such places sources of water with different F concentration can exist (with absence or surplus of F), the amount of children who used water from them can be different;
- individual predisposition and dental fluorosis risk factors;
- environmental conditions (pollution of water and soils with different organic and inorganic combinations, etc.);
- character of nutrition; level of physical development and conditions of children's health.

While in areas with F concentration in drinking water up to 5 mg/L equivocal and feeble cases of disease among children prevail, in locations with F concentration more than 5 mg/l moderate and severe forms of disease prevail, which confirms the data of the authors who studied this problem in other countries [1,3, 11] (*Figure 3*).

Dental fluorosis equally affects male and female children, but equivocal and feeble forms are more frequent among girls, while feeble, moderate and severe forms are more frequent among boys ($p > 0.05$). It shows that, in fact, boys, compared to girls, are affected by greater amount of dental fluorosis risk factors (pregnancy pathologies, artificial nutrition during the first year of life, systemic diseases, etc.).

Study of frequency and intensity of fluorosis affection of each tooth has ascertained symmetrical character of affection: upper and lower, left and right ($p < 0.05$). Most frequently affected by fluorosis teeth are 36 and 46 (84.85%), 16 (84.77%) and 26 (84.48%).

Further in the decreasing order, teeth 17, 27, 37, 47 (82.07-83.65%); teeth 11, 21, 31, 41 (74.73 - 77.48%); teeth 12, 22, 32, 42 (61.39 - 66.09%); teeth 14, 24, 34, 44 (55.33 - 55.94%); teeth 15, 25, 35, 45 (53.10 - 54.48%), the most rare case of affection is canines (47.76 - 48.27%).

The most severely affected by fluorosis are upper central incisive teeth 21 (1.86) and 11 (1.85), then molars I (1.62- 1.69). Further, in the decreasing order - molars II (1.54 - 1,71); upper lateral incisives (1.52 - 1.54), central lower incisives (1.43 - 1.44); upper and lower premolars (1.24 - 1.38); lower lateral incisives (1.21 - 1.22) and the most rare case of affection are in canines (0.88-0.99).

In most cases teeth of these children could be affected by fluorosis of different

intensity. Together with increasing intensity of fluorosis affection, the number of affected teeth increased. In severe cases the signs of dental fluorosis could be seen on all dental surfaces. In

cases of moderate or severe forms of dental fluorosis all the teeth were affected, including temporal teeth.

Figure 1. Frequency and intensity of teeth affection by fluorosis among children

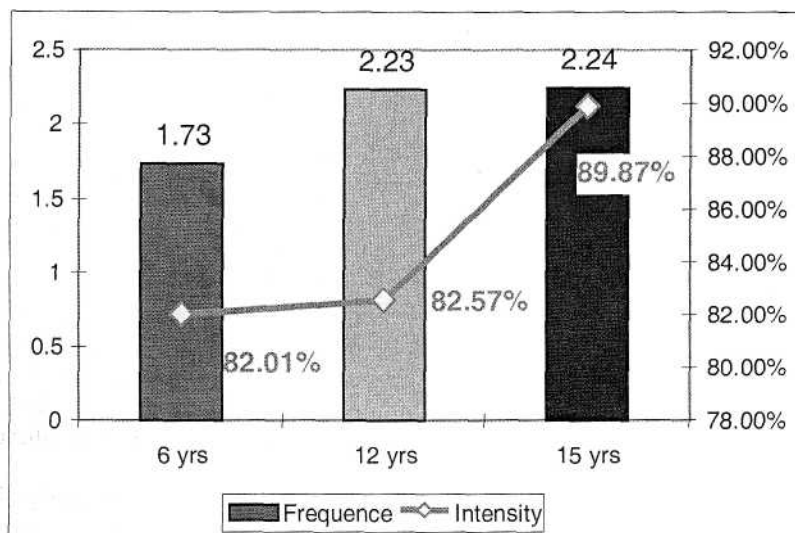


Figure 2. Frequency of dental fluorosis among children from different areas (%)

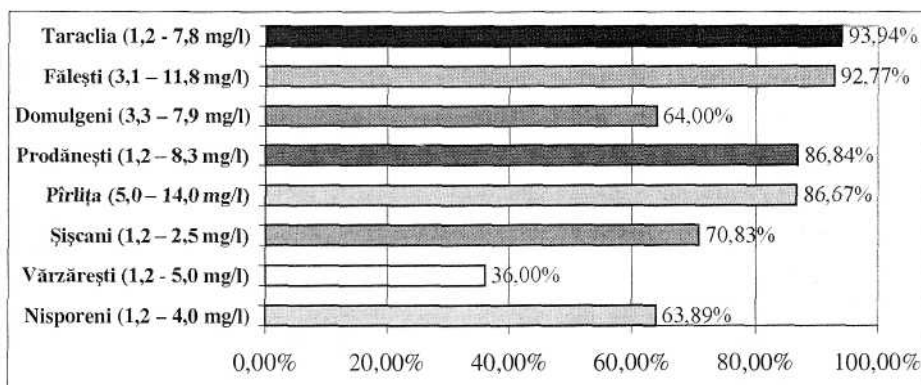
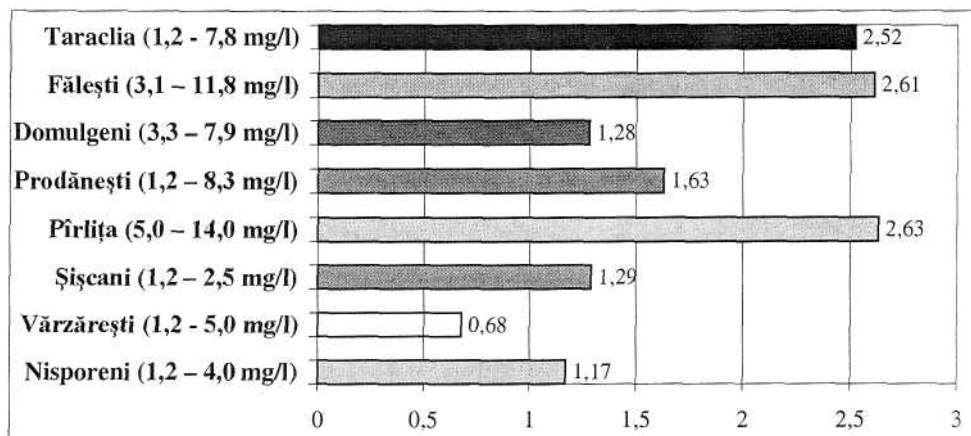


Figure 3. Intensity of dental disease among children according to location



Temporary teeth of 20.11% of children were affected by fluorosis, which corresponds to the data in special literature, according to which the frequency of dental fluorosis of temporary teeth vary from 2.1% to 49.5% [9, 12].

Upper and lower temporary molars are equally affected by fluorosis ($p < 0.05$). Intensity of temporary teeth affection by fluorosis, according to WHO, varies from equivocal to slight degree.

We also took into consideration the fact that not all the children who consumed water with excessive concentration of F were affected by dental fluorosis, which means that the existence of individual resistance to fluorosis [9] can misrepresent the necessity of more detailed studies of risk factors.

The study of risk factors makes evident the increase of frequency of dental fluorosis among children born in December-January, and less intensive increase among children born in August. It can be explained by the fact that children born in December-January begin to receive additional nutrition in June-July; besides that in summer the consumption of water increases.

It was ascertained that the following risk factors are favorable for emergence of dental fluorosis: introducing of substitutions of maternal milk, pregnancy pathologies, general amount of diseases, artificial nourishing during the first years of child's life, dental diseases, especially during the first year of child's life.

On the basis of selected risk factors rational methods of primary prevention of dental fluorosis in the present-day conditions of the Republic of Moldova were proposed:

- a) interdiction of water consumption with F concentration more than 1.5 mg/L for the children from birth to the age of 12;
- b) for the children living in endemic areas of fluorosis, especially in the first year of life, and especially for those who receive artificial or mixed alimentation, it is recommended to consume bottled water (containing no F) for preparation of lichors and food stuff (tea, artificial milk, soup, etc.);
- c) for the population located in fluorosis areas, especially for children, it is recommended to use water filters, which allow a

decrease in the content of F in water of up to 1/2 or more.

The affection of teeth by dental fluorosis triggers aesthetic and psychological shatter to 8-9 year old children, and especially in the period of puberty. In cases of pigmentation on durable tissues recovering vitalizing whitening is applied to the vestibular surface of front teeth. However, depigmentation of teeth does not often give sufficiently good and stable results in desolate cases of dental fluorosis. That is why after 2-3 procedures of depigmentation, microhybride composite materials are used for color correction, and in some cases the above mentioned materials are used for the correction of teeth forms affected by fluorosis - without preparation of vestibular parts of front teeth crowns or with minimal preparation limited to enamel. The proposed methods of fluorosis treatment by atraumatic restauration (ART), according to WHO, include manual ablation, extraction of dental tissues with special instruments and elimination of defects with ionomer cement [2].

54 children at the age 6 to 18 years with different forms of dental fluorosis were cured by the proposed method. Proposed methods of restoration were indicated in grade III-V (WHO) children and adolescents, especially in the period of formation of teeth and marginal paradontal tissues.

In 6, 12 and 18 months, the observed errors in restauration of teeth affected by fluorosis, cured by the proposed method were lower in comparison with the data of FDI (5% and 10%) on composite materials.

The recommended treatment methodology of fluorosis with stable aesthetic functional results is permitted for clinical research on condition of precise fulfillment of stomatological technology.

The improvement of stomatological assistance to children in fluorosis endemic zones in present-day conditions in the Republic of Moldova, in our point of view, has to begin with orientation of stomatological assistance towards prevention of main stomatological diseases including dental fluorosis.

Conclusions

1. Frequency and intensity of teeth affection by dental fluorosis among children at the age 6, 12 and 15 are directly proportional to the increase of fluoride concentration in drinking water

2. Risk factors for the appearance of dental fluorosis are: drinking of water with F concentration more than 1.5 mg/L from birth to the age of 12; most evident is increasing frequency of dental fluorosis among children born in December-January and August, pregnancy pathologies, artificial nourishing during the first year of life, introducing of substitutions of maternal milk for the children at the age of 6 months, dental diseases, especially during the first year of life.

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3. On the basis of selected risk factors, methodology on primary prevention of dental fluorosis among children was worked out.

4. The method of teeth restauration includes whitening and restauration with microhybride composite materials of the latest generation, which are contemporary and efficient in treatment of advanced forms of dental fluorosis in children.

и постоянно проживающих в различных по уровню содержания фтора в питьевой воде регионах Азербайджана. *Стоматология*, 2000; 2: 34-35.

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