

Prevalence and Prevention of Fluorosis in Children Living in the Districts of the Bukhara Region

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Abstract. Fluorine is embedded in the structure of the main mineral substance of the tooth tissue – hydroxyapatite, which turns into a much harder fluorohydroxyapatite. Fluoride is especially important for the hardness of the tooth enamel. The recommended daily dose of fluoride is only 0.05 mg / kg, however, with an increase in the dose of fluoride by only 0.01 mg / kg, the risk of fluorosis increases significantly (Nikolishin A.K. 1999). The presence of high concentrations of fluoride in drinking water (1.5-12.0 mg / l) is the main etiological factor of fluorosis. The concentration of fluoride in water up to 0.5 mg / l, as a rule, does not cause any manifestations of fluorosis in the tissues of the teeth.

Key words: Fluorosis, prevalence, children, prevention, treatment, areas

From the studies of many scientists, it can be seen that the level of prevalence of dental morbidity among the child population remains very high to date, and there is a tendency for its further growth [1,2,3,4]. Despite the fact that many etiological factors of the main dental pathologies, and the mechanism of their action, are well known to date, the ongoing scientific research does not stop.

It should be noted that one of the most pressing and urgent tasks of health care is to assess the quality of dental care to the population [5,6,7,8]. A number of authors believe that in a comprehensive assessment of the quality of dental care, it is necessary to take into account epidemiological and environmental factors [1,2,9,10]. Dental fluorosis is a disease that develops when an excess amount of fluoride enters the body during the formation of teeth and is characterized by the appearance of chalky and / or pigmented spots, as well as destruction of enamel [6,7].

According to studies by Brazilian scientists, the prevalence of dental fluorosis is 18-36% in children aged 12-15 years [11]. The works of authors from Jamaica indicate 39-67% of the defeat of the child population [12], from China from 49% to 100% in children aged 10-15 years [13].

The works of authors from Jamaica indicate 39-67% of the damage to children. Fluorine is embedded in the structure of the main mineral substance of the tooth tissue - hydroxyapatite, which turns into a much harder fluorohydroxyapatite. Fluoride is especially important for the hardness of the tooth enamel. The recommended daily dose of fluoride is only 0.05 mg / kg, however, with an increase in the dose of fluorine by only 0.01 mg / kg, the risk of fluorosis increases significantly (Nikolishin A.K. 1999).

The presence of high concentrations of fluoride in drinking water (1.5-12.0 mg / l) is the main etiological factor of fluorosis. The concentration of fluoride in water up to 0.5 mg / l, as a rule, does not cause any manifestations of fluorosis in the tissues of the teeth. When examining persons living in areas with a low fluoride content in drinking water, cases of fluorosis are practically not detected (Cherkasov S.M., 2014).

With an increase in the concentration of fluoride to 1.5-3.0 mg / l, moderate isolated changes in tooth enamel occur, 4.0-8.0 mg / l - a severe form of dental fluorosis and a moderate form of

skeletal bone fluorosis, 8.0 mg / l and more - a severe form of fluorosis of the teeth and bones of the skeleton. Currently, the optimal range of fluorine concentration in drinking water is 0.6-0.7 - 1.2-1.5 mg / l, and a lower concentration of fluorine is recommended for warmer climates, where water consumption is higher (Malkova I.L. Pyankova L.G., 2008; Pihur O.L., Wolfson I.F., 2010; Triller M. 1998; Dhar V., Bhatnagar M., 2009).

There are several classifications of dental fluorosis. According to the classification of V.K. Patrikeev (1956) are distinguished:

- dashed line;
- spotted;
- chalky-speckled;
- erosive;
- destructive forms.

It should be noted that the last two forms of pathology occur with the loss of hard tooth tissues to one degree or another [12].

The study of special literature has shown that the maximum distribution in domestic dentistry belongs to the classification of Gabovich R.D. (1957):

I degree - a weak lesion, in which small chalky spots appear on the vestibular or oral surfaces of the incisors, as well as on the chewing surface of the first molars, which are difficult to distinguish with the naked eye;

II degree - similar chalky or slightly pigmented to light yellow spots (single or multiple) covering up to 50% of the crowns, noted on many teeth;

III degree - moderate damage to the crowns of a large number of teeth, manifested in the form of larger spots that occupy more than 50% of the crown surface with more intense pigmentation (dark yellow and dark brown). At the same time, the teeth are more brittle and fragile, they are easily abraded;

IV degree - severe damage. In addition to the changes described earlier, the appearance of a significant number of erosions of various shapes, which can merge with each other, is characteristic. Chalky enamel is characterized by a "lifeless" appearance; roughness is noted on its surface. Pronounced abrasion and chipping of tooth enamel prevails due to increased fragility of hard tissues. Sometimes there is a loss of the anatomical shape of some teeth, which can lead to a malocclusion.

The degree of concern of patients with dental fluorosis depends on the severity of clinical manifestations, as well as on its stability and psychological characteristics [6]. For example, in a mild form, patients complain of aesthetic perception, and no other sensations are observed [13].

And with severe lesions of fluorosis, the range of patient complaints expands, and, in addition to the aesthetic problem, a number of other symptoms join, such as the appearance of pain syndrome under the influence of temperature stimuli and tooth wear [14].

Thus, the study of issues related to the pathogenesis, therapy and secondary prevention of fluorosis is a very urgent task.

The purpose was to reveal the prevalence of fluorosis in school-age children and, on this basis, to improve the methods of treatment and secondary prevention of this disease in order to improve the state of their dental health.

Materials and methods.For the observations, 3 districts were selected (Jondor, Romitan and Peshku districts of Bukhara region). The study used data from 393 children with dental fluorosis aged 6, 12 and 15.

Of these, 146 children 6 years old, mild dental fluorosis (streak and spotted) was detected in 100 children (40 boys - 40%, 60 girls - 60%). Of 137 children 12 years old, 93 children of streak and spotted form with dental fluorosis were identified (30 boys - 32%, 63 girls - 67%). Of 110 children 15 years old, mild fluorosis (dashed and spotted) was detected in 77 children (27 boys - 35%, 50 girls - 65%). All examined children from 3 districts (Jondor, Romitan and Peshku) of Bukhara region had mild dental fluorosis (dashed or spotted) according to the classification of Patrickeva V.K.

Thus, the total number of children with dental fluorosis was 217 children. In each age group of 270 children, a comparison group of 10 healthy children with no dental caries and fluorosis was formed. From this number of children, groups of 30 people were formed using a random sample. In the group 6 years old (10 boys - 33%, 20 girls - 65%), 12 years old (12 boys - 40%, 18 girls - 60%), 15 years old (7 boys - 23%, 23 girls – 77%).

The next step was the division of children within these age groups into 3 subgroups of 10 people (6, 12 and 15 years old). Determination of the studied parameters was carried out for all children before and 1 month after the start of the study, and the study of indicators of the state of hard tissues of teeth and oral hygiene was repeated 6 months after the start of therapy.

In each age group, one subgroup of patients received “Supradin kids”, another - gel “MI Tooth Mousse”, the third - a combination of the drug “Supradin kids” and gel “MI Tooth Mousse” control group with signs of dental fluorosis. (Tables 1 and 2).

Tables. 1
The main stages of the study

Researchstages	Researchmethods	Number of children
1	2	3
Survey conducted before the start of the study	Dental examination to detect dental fluorosis in children 6, 12 and 15 years old. Dental examination and questionnaire survey to determine the clinical form of dental fluorosis in children 6, 12 and 15 years old.	393children 270children

	Dental examination of children 6, 12 and 15 years old without dental pathology for the control group	30 children
Examination of children 6, 12 and 15 years old with dental fluorosis before the start of treatment	<ol style="list-style-type: none">1. Determination of the condition of enamel resistance, determination of the index of the intensity of caries and the level of oral hygiene.2. Carrying out professional oral hygiene procedures.3. Immunological methods for studying indicators of the oral fluid.	90children

<p>Applied for medical treatment regimens</p>	<p>Children who were prescribed “Supradin kids” (1 tablet 3 times a day. Children 6 years old, children 12 and 15 years old, 1 tablet 3 times a day for 4 weeks).</p> <p>Children who were assigned applications gel “MI Tooth Mousse” (daily for 4 weeks).</p> <p>Children who were also prescribed Supradin kids 1 tablet 2 times a day, children 6 years old, 1 tablet 3 times a day, children 12 and 15 years old for 4 weeks + MI Tooth Mousse gel, (daily for 4 weeks).</p>	<p>90 Children</p> <p>90 Children</p> <p>90 Children</p>
<p>1 month after the start studies of children 6, 12 and 15 years old with dental fluorosis</p>	<ol style="list-style-type: none"> 1. Determination of GI and TER test 2. Biochemical methods for studying lysozyme activity and SIgA concentration. 3. Biochemical methods for studying indicators of peroxide metabolism <p>1.</p>	<p>270 Children</p>

Examination of children 6, 12 and 15 years old, 6 months after the start of the study with dental fluorosis	Conducting GI and TER tests	270 Children

Table 2.
A group of children aged 6, 12 and 15 years with fluorosis, distributed according to the therapy

Age	Treatment performed	Amount of children
Children 6 yearsold	“Supradin kids”	10
	“MI Tooth Mousse gel”	10
	“Supradin kids”+ “MI Tooth Mousse” gel	10
Children 12yearsold	“Supradin kids”	10
	“MI Tooth Mousse gel”	10
	“Supradin kids” + “MI Tooth Mousse” gel	10
Children 15yearsold	“Supradin kids”	10
	“MI Tooth Mousse gel”	10
	“Supradin kids” + “MI Tooth Mousse” gel	10

Children are not participating in the study:

children who do not live in three districts of the Bukhara region;

- other diseases of the oral cavity, except for streaked or spotted forms of fluorosis and dental caries;
- diseases of the gastrointestinal tract in children;

- oncological diseases in children;
- endocrine diseases in children;
- kidney disease in children;
- diseases of the cardiovascular system in children;
- chronic infections in children;
- incurable inflammatory processes in children.

Conclusion

1. Of 393 children 6.12 and 15 years old, living in three districts of the Bukhara region, out of 146 children 6 years old, mild dental fluorosis (streaked and spotted) was detected in 100 children (40 boys - 40%, 60 girls - 60%). Of 137 children 12 years old, 93 children of streak and spotted form with dental fluorosis were identified (30 boys - 32%, 63 girls - 67%). Of 110 children 15 years old, mild fluorosis (dashed and spotted) was detected in 77 children (27 boys - 35%, 50 girls - 65%). At the same time, children of all age categories showed a satisfactory level of oral hygiene, an average level of caries intensity and a level of enamel resistance within 30 points.
2. Children who were also prescribed Supradin kids 1 tablet 2 times a day, children 6 years old, 1 tablet 3 times a day, children 12 and 15 years old for 4 weeks + MI Tooth Mousse gel, (daily for 4 weeks) showed the greatest positive dynamics in the level of the hygienic index, the level of enamel resistance during the observation period.
3. A comparative assessment of the effectiveness of the therapy in children with dental fluorosis of all age categories demonstrated a positive result of combined use, in contrast to children who only used Supradin Kids and MI Tooth Mousse gel separately.

References

1. A brief review on experimental fluorosis / E. Perumal, V. Paul, V. Govindarajan, L. Panneerselvam // *ToxicolLett.* 2013. - Vol. 223(2). - P. 236-251.
2. A comparative study of salivary buffering capacity, flow rate, resting pH, and salivary immunoglobulin A in children with rampant caries and caries-resistant children / S. Kuriakose, C. Sundaresan, V. Mathai [et al.] // *J Indian SocPedodPrev Dent.* - 2013. - Vol. 31. - P. 69-73.
3. A national cross-sectional study on effects of fluoride-safe water supply on the prevalence of fluorosis in China / C. Wang, Y. Gao, W. Wang. et al. // *BMJ Open.* - 2012. - Vol. 2 (5). - pii: e001564.
4. Albrecht, M. Dental fluorosis in children in Bar and Dunaszekcso in the 6-18 age group / M. Albrecht, E. Maros // *Orv Hetil.* - 2004. - Vol. 145 (5). - P. 229-232.
5. Aoba, T. Dental fluorosis: chemistry and biology / T. Aoba, O. Fejerskov // *Crit Rev Oral Biol Med.* - 2002. - Vol. 13 (2). - P. 155-170.
6. Assessment of anti-mutagenic, anti-histopathologic and antioxidant capacities of Egyptian bee pollen and propolis extracts / A.A. Tohamy, E.M. Abdella, R.R. Ahmed, Y.K. Ahmed // *Cytotechnology.* - 2014. - Vol. 66 (2). - P. 283-297.
7. Barrier formation: potential molecular mechanism of enamel fluorosis / D.M. Lyaruu, J.F. Medina, S. Sarvide [et al.] // *J Dent Res.* - 2014. - Vol. 93(1). - P. 96-102.
8. Basha, M.P. Chronic fluoride toxicity and myocardial damage: antioxidant offered

- protection in second generation rats / M.P. Basha, N.S. Sujitha // *Toxicol Int.* - 2011. - Vol. 18 (2). - P. 99-104.
9. Coal-burning endemic fluorosis is associated with reduced activity in antioxidative enzymes and Cu/Zn-SOD gene expression / Q. Wang, K.P. Cui, Y.Y. Xu [et al.] // *Environ Geochem Health.* - 2014. - Vol. 36 (1). - P. 107-115.
 10. Taylakova D.I, KamilovKh.P, Kasymov M.M The prevalence of systemic hypoplasia in children depending on the adverse environmental conditions and their prevention / *INTERNATIONAL JOURNAL FOR SOCIAL STUDIES.* – 2019. - Vol 5 (4) - P. 25-33.
 11. Rubio, C.A. The natural antimicrobial enzyme lysozyme is up- regulated in gastrointestinal inflammatory conditions / C.A. Rubio // *Pathogens.* - 2014. - Vol 3, №1. - P. 73-92.
 12. High fluoride and low pH level have been detected in popular flavoured beverages in Malaysia / Z. Ha Rahim, M.M.Bakri, H.M. Zakir [et al.] // *Pak J Med Sci.* - 2014. - Vol. 30 (2). - P. 404-408.
 13. Stephen, K.W. Systemic fluorides: drops and tablets / K.W. Stephen // *Caries Res.* 1993. - Vol. 27 (Suppl. 1). - P. 9-15.
 14. Study on demineralization and remineralization of human fluorosed teeth in vitro / L. Luo, H. Li, J. Liang [et al.] // *Sheng Wu Yi Xue Gong Cheng XueZaZhi.* - 2010. - Vol. 27(1). - P. 116-119, 125.