



## MEDICAL ASPECTS OF THE COMPREHENSIVE PREVENTION AND TREATMENT OF FLUOROSIS IN CHILDREN LIVING IN AN ENDEMIC AREA

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### Introduction

The health of the population, and before all children, is directly dependent on the composition of natural waters in the sources that make up the water supply of a given territory. It is known that excessive fluoride content in drinking water (more than 1.5–2 mg/l) leads to the development of fluorosis in 30% of the population, from 2-6 mg/l – in 80% of the population living in an endemic region. The risk group appears in children aged 3-4 years, which corresponds to the beginning of mineralization of the enamel of permanent teeth [1]. There is still no single point of view on the pathogenesis of this disease. According to most researchers, the development of fluorosis is due to the toxic effect of fluorides on ameloblasts during the formation of enamel of temporary or permanent teeth, as a result of which its mineralization processes are disrupted with the formation of defects in the subsurface layer and the accumulation of spawning compounds of fluorapatite, calcium fluoride, magnesium fluorophosphate both on the surface of the enamel and inside it [2]. In recent years, there has been more and more information about violations of biochemical processes in oral fluid in patients with fluorosis [3]. It is known that an excess of fluoride disrupts the calcification process of hard dental tissues: at the first stage, the hydrolysis of the phosphoric acid ester by alkaline phosphatase occurs with the formation of phosphoric acid. In the second stage, phosphoric acid reacts with calcium to form tricalcium phosphate, which precipitates. Fluorine inhibits this phase, which leads to the compensatory release of alkaline phosphatase. In addition, children with fluorosis have a low level of catalase activity (one of the main enzymes of antioxidant protection), a high value of elastase and acid phosphatase (Gorokhivsky V.N., 2015). In the womb of a blood mother suffering from fluorosis, the activity of superoxide dismutase is reduced, and the level of malondialdehyde (MDA) and the activity of myeloperoxidase are associated with healthy leaves [4, 5]. At the same time, there are insufficient free oxidation (SRO) and antioxidant protection in the saliva of patients with fluorosis. In addition, generally accepted recommendations for the treatment and secondary prevention of fluorosis have not yet been formulated. Most of the recommendations for topical treatment are limited to examples of various options for removing enamel. Excretory drugs contain potent peroxide compounds that cause





irreversible demineralization of enamel, increase its permeability, and sharply affect the soft tissues of the oral cavity, which is unacceptable in childhood. In our opinion, the treatment of fluorosis should be comprehensive, including both exo- and endogenous use of drugs capable of correcting isolated biochemical and immunological changes. In connection with the above, the purpose of the current study was to extract the effect of a combined example of the gel r.o.c.s. vinibis drug on tooth enamel resistance, the hygienic condition of the oral cavities, as well as indicators of local oral immunity and antioxidant protection in children with fluorosis. Materials and methods of work were carried out on the basis of the Department of Propaedeutic Dentistry of the Nizhny Novgorod State Medical Academy and educational institutions of the Republic of Mordovia. 272 people living since birth in Saransk or in other regions of Mordovia, where the fluoride content in drinking water ranged from 2.5 to 7 mg/l, were examined. 180 children were selected from among all those studied by simple randomization, divided into three groups of 60 people depending on age. The first group included children in the renaissance period of 6 years old, the second group included children of 9 years old; the third group includes children of 12 years old. The assessment of dental status included the determination of the intensity of dental caries according to the KPIs for 12-year-old children and the KPIs+kp index for 6- and 9-year-old children, as well as an assessment of oral hygiene according to the Green-Vermillion index. All patients have completed a course of oral hygiene, professional hygiene, reasonable hygiene training and individual selection of hygiene products. In each age group of patients, general and local treatment was carried out in order to increase the resistance of enamel and increase the protective factor of oral fluid by increasing the activity of the enzyme antioxidant system. as a local therapy for fluorosis. Gel was used. A medicinal mineral (calcium glycerophosphate + magnesium chloride + xylitol), which has an anti-cariogenic effect and does not contain fluoride [1]. Vinibis preparation, which contains bee products – perga, was chosen as a remedy with antioxidant properties. Each age group was divided into 3 subgroups depending on the type of treatment used. In the first subgroup, after brushing my teeth for 4 weeks, 1 day 2 times, in the form of an application, I received only local treatment with Medical Minerals gel. In terms of general treatment, patients of the 2nd subgroup were prescribed Vinibis, a preparation from perga - 1 of the most active bee products, taken 1 tablet 1 time a day 3 times for 4 weeks. In the 3rd subgroup of patients of each age group, simultaneous use of these drugs was performed. Additional examination methods for assessing the acid resistance of the enamel of permanent teeth in children are the enamel resistance test, the TER test (V.R.Okushko, 1984). The main advantages of TER testing are the





speed of its execution, high information content and low cost. The technique was as follows: drops of ordinary hydrochloric acid with a diameter of 2 mm were pre-washed with distilled water and applied to the dry surface of the central upper incisors. After 5 seconds, the acid was washed off with distilled water and the tooth surface was dried. The depth of microdefects during etching of enamel was estimated by the intensity of its staining with a 1% solution of methylene blue. The etched area was colored blue. The degree of staining reflected the depth of damage to the enamel and was evaluated using a blue reference printing scale, where each strip corresponds to a step of 10% [1]. All studies were conducted before treatment, after the course of treatment and 6 months after treatment. To assess the Mda content, colored complexes formed as a result of the interaction of mda with thiobarbituric acid were studied using spectrophotometry. The concentration of Siga was determined by solid-phase enzyme immunoassay. Catalase activity was determined by titration, and lysozyme was determined by V. It was studied by the Dorofeichuk method of nonferometry. In the saliva of clinically healthy children, starting from the age of 5, the control value of the sIgA concentration is 120-230 mg/l, lysozyme activity is 32.8-50.2% [3]. Statistical processing was carried out using the Statistika5.5 statistical package. The results are displayed as  $M \pm m$ , where  $m$  is the arithmetic mean and  $m$  is the standard error of the arithmetic mean. The level of statistical significance of differences between samples with a distribution other than normal was determined using the Student's t-test; between paired samples with a distribution other than normal using the Wilcoxon criterion and the sign; and between independent samples with a distribution other than normal using the Wilcoxon criterion. criterion and Van der Waarden. Results and discussion The study of the dental condition in children was mainly conducted at the V.K. clinic. The presence of spotted and striped fluorosis was indicated in accordance with the Patrikeev classification.[6] The intensity of caries in the examined group ranged from 1.9-2.0 to 3.0-3.1 for affected teeth, which, according to the WHO classification, was the highest in the group of 12-year-olds, which corresponds to the average degree of caries intensity. The obtained values confirm the literature data on the low prevalence and intensity of caries in the zone of endemic fluorosis. When studying the hygiene index, we obtained the following results. The values of the hygiene index before treatment in all subgroups of the examined were in the range of 1.6–2.0, which corresponded to a satisfactory level of hygiene. The best results were noted in a subgroup of 12-year-old patients who underwent combination therapy with R.O.C.S. Medical Minerals gel and Vinibis drug - from 1.9 to 0.3 values, as well as in a subgroup where only R.O.C.S. Medical Minerals gel was applied topically – from 1.9 to 0.7. In 6-year-old children, the best result in improving oral hygiene was



observed in the subgroup using R.O.C.S. Medical Minerals gel, depending on age. The first group included children aged 6 years, the second group included children aged 9 years; the third group included children aged 12 years. The assessment of dental status included the determination of the intensity of dental caries according to the KPIs for 12-year-olds and the KPIs+kp index for 6- and 9-year-olds, as well as the level of oral hygiene according to the Green–Vermillion index - OHI-S (Green J., Vermillion J., 1969). All patients underwent oral sanitation, professional hygiene, rational hygiene training and individual selection of hygiene items and products. In each age group of patients, we conducted general and local treatment aimed at increasing the resistance of enamel and increasing the protective factors of oral fluid by increasing the activity of the enzymatic antioxidant system. R.O.C.S. gel was used as a local therapy for fluorosis. Medical Minerals (calcium glycerophosphate + magnesium chloride + xylitol), which has an anti-cariogenic effect and does not contain fluoride [1]. As a remedy with antioxidant properties, the drug Vinibis was chosen, which contains bee products – perga. Each age group was divided into 3 subgroups according to the type of treatment used. The first subgroup received only topical treatment with R.O.C.S. Medical Minerals gel in the form of applications twice a day after brushing their teeth for four weeks. In terms of general treatment, patients of the second subgroup were prescribed Vinibis, a perga preparation, one of the most active bee products, taken 1 tablet 3 times a day for four weeks. In the third subgroup of patients of each age group, the combined use of these drugs was carried out. An additional examination method for assessing the acid resistance of the enamel of permanent teeth in children was the enamel resistance test, the TER test (V.R. Okushko, 1984). The main advantages of the TER test are the speed of its execution, high information content, as well as low cost. The technique was as follows: a drop of normal hydrochloric acid with a diameter of 2 mm was applied to the pre-cleaned, washed with distilled water and dried surface of the central upper incisor. After 5 seconds, the acid was washed off with distilled water, and the tooth surface was dried. The depth of the microdefect of enamel etching was estimated by the intensity of its staining with a 1% solution of methylene blue. The etched area turned out to be colored blue. The degree of staining reflected the depth of damage to the enamel and was evaluated using a blue reference printing scale, where each strip corresponds to a step of 10% [1]. All studies were conducted before treatment, after the course of treatment and 6 months after treatment. To assess the content of MDA, a spectrophotometric method was used to study the colored complex formed by the reaction of MDA with thiobarbituric acid. The concentration of sIgA was determined by solid-phase enzyme immunoassay. Catalase activity was studied by titrometric method, lysozyme by nephelometric method according to V.F.





Dorofeychuk. In the saliva of clinically healthy children, starting from the age of 5, the reference values of sIgA concentration are 120-230 mg/l, lysozyme activity is 32.8-50.2% [3]. Statistical processing was performed using the Statistika 5.5 statistical package. The results are presented in the form  $M \pm m$ , where  $M$  is the arithmetic mean,  $m$  is the standard error of the arithmetic mean. The level of statistical significance of differences between samples with a distribution not different from normal was determined using the Student's t-test; between paired samples with a distribution different from normal, using Wilcoxon criteria and signs; between independent samples also with a distribution different from normal, using Wilcoxon criteria and Van der Waerden.

### **Results and discussion:**

The study of the dental status of children showed mainly the presence of spotted and streaked fluorosis according to the classification of V.K. Patrikeev [6]. The intensity of caries in the examined groups ranged from 1.9–2.0 to 3.0–3.1 affected teeth and was highest in the group of 12-year-olds, which, according to the WHO classification, corresponds to the average degree of caries intensity. The obtained values confirm the literature data on the low prevalence and intensity of dental caries in the regions of endemic fluorosis. When studying the hygiene index, we obtained the following results. The values of the hygiene index before treatment in all subgroups of the examined were in the range of 1.6–2.0, which corresponded to a satisfactory level of hygiene. The best results were noted in a subgroup of 12-year-old patients who underwent combination therapy with R.O.C.S. Medical Minerals gel and Vinibis drug – from 1.9 to 0.3 values, as well as in a subgroup where only R.O.C.S. Medical Minerals gel was applied topically - from 1.9 to 0.7. In 6-year-olds In children, the best result in improving oral hygiene was observed in the subgroup using R.O.C.S. gel. Six months after the treatment, the values of IG in the subgroups of 12-year-olds remained consistently low. The values of IG in the subgroups of 6- and 9-year-old children deteriorated slightly 6 months after treatment and dropped to satisfactory values, however, in the subgroups with combined therapy of R.O.C.S. Medical Minerals gel and Vinibis drug, these changes were minimal and did not exceed the hygiene values of 1.3 as a result. The TER tests were most interesting in terms of evaluating changes in the enamel structure after our treatment. In the group of 6-year-old children, the values of the TER test before treatment were the same in all subgroups and amounted to 18-19, which corresponded to a low degree of enamel resistance. After the treatment, a significant decrease in stainability was recorded in all three subgroups, with the maximum decrease in patients who used R.O.C.S. Medical Minerals and





Vinibis gel (Fig. 2). In the group of 9-year-olds (Fig. 3) and 12-year-olds (Fig. 4), the following results were obtained similar results. In all subgroups, there was an increase in the resistance of the enamel to acidic effects immediately after treatment, and, importantly, it remained at the achieved level 6 months after the therapy. The maximum result was obtained when using a combined treatment with R.O.C.S. Medical Minerals gel and Vinibis drug. When evaluating the indicators of the antioxidant system in the oral cavity in children suffering from fluorosis, the following pattern is noted: the highest concentration of malondialdehyde was detected in patients aged 12 years. The level of MDA in the saliva of 9- and 6-year-olds was lower than that of 12-year-olds by 25% and 44%, respectively. After the course use of the drug Vinibis, a significant decrease in the concentration of lysozyme in the mixed saliva of children of these age groups was recorded. Reliable analysis of the results indicates the presence of age-related characteristics of the studied indicators. Thus, in children with fluorosis, there is an increase in the concentration of MDA and at the same time a decrease in catalase activity in mixed saliva with age, as well as decreased lysozyme activity and low levels of sIgA concentration, especially in the younger age group. The use of the Vinibis drug made it possible to significantly reduce the concentration of MDA and increase the activity of catalase in mixed saliva in all age groups of children, which indicates its ability to reduce the intensity of the SRO process and increase the activity of the enzymatic antioxidant system. In addition, the use of the drug perga allowed to increase the activity of lysozyme and the concentration of sIgA in saliva.

### **Conclusion:**

Thus, the combined use of the R.O.C.S. Medical Minerals gel and the Vinibis perga preparation leads to an increase in enamel resistance, an improvement in the hygienic condition of the oral cavity, allows correcting the identified immunological and biochemical disorders in the oral fluid and can be recommended as part of the complex therapy of dental fluorosis in children

### **References:**

1. Asrorovna X. N. et al. Clinical Application of Dental Photography By A Dentist //The American Journal of Medical Sciences and Pharmaceutical Research. – 2021. – T. 3. – №. 09. – C. 10-13.
2. Astanovich A. D. A. et al. The State of Periodontal Tissues in Athletes Engaged in Cyclic Sports //Annals of the Romanian Society for Cell Biology. – 2021. – C. 235-241.





3. Shuxratovich S. S. et al. The Country Of Dental Implanting, The Risks Involved //The American Journal of Medical Sciences and Pharmaceutical Research. – 2021. – Т. 3. – №. 09. – С. 142-146.
4. Asrorovna X. N. et al. Methods Of Instrumental Treatment of Root Canals //Texas Journal of Medical Science. – 2021. – Т. 2. – С. 17-19.
5. Asrorovna X. N. et al. Clinical Application Of Dental Photography By A Dentist //The American Journal of Medical Sciences and Pharmaceutical Research. – 2021. – Т. 3. – №. 09. – С. 10-13.
6. Шукурова Н. Т., Муратова С. К., Тураев А. Б. Врачебная тактика при диагностике туберкулеза полости рта //Вестник науки и образования. – 2020. – №. 18-2 (96). – С. 86-91.
7. Тураев А. Б., Муратова С. К., Джавадова Л. М. Повышение эффективности лечения заболеваний пародонта с применением местно действующего препарата " пародиум" //Современные достижения стоматологии. – 2018. – С. 116-116.
8. Fakhriddinovna A. N. et al. Platelet condition in children with congenital cleft palate in chronic foci of infection //Достижения науки и образования. – 2019. – №. 12 (53). – С. 113-115.
9. Zoirov T. E. et al. The influence of hypertension on the Pro-oxidant capacity and lipid peroxidation in oral fluid //Central Asian Journal of Medical and Natural Science. – 2021. – Т. 2. – №. 2. – С. 46-52.
10. Абсаламова Н., Содикова Ш., Гулбоева З. ПРОГРАММА ДЛЯ ОПРЕДЕЛЕНИЯ ВЫБОРА МЕСТНОЙ ТЕРАПИИ ПРИ ВОСПАЛИТЕЛЬНЫХ ЗАБОЛЕВАНИЙ ПАРОДОНТА БЕРЕМЕННЫХ ЖЕНЩИН С ЖЕЛЕЗОДЕФИЦИТНОЙ АНЕМИЕЙ //Медицина и инновации. – 2021. – Т. 1. – №. 4. – С. 536-539.
11. Тураев А. Б. и др. ВЛИЯНИЕ ОРТОДОНТИЧЕСКИХ АППАРАТОВ НА ПАРОДОНТ //TADQIQOTLAR. UZ. – 2024. – Т. 31. – №. 4. – С. 61-64.
12. Муродилло Т. А. В. Х. Т. и др. PERIODONTAL TISSUE CHANGES IN PATIENTS WITH INFECTIOUS VIRAL DISEASES //Journal of Modern Educational Achievements. – 2024. – Т. 1. – №. 1. – С. 223-228.
13. Bahriddinovich T. A. POSITIVE AND NEGATIVE PROPERTIES OF BRACES IN THE TREATMENT OF DENTAL ANOMALIES //Journal of Modern Educational Achievements. – 2024. – Т. 1. – №. 1. – С. 195-199.
14. Bahriddinovich T. A. COMPLEX TREATMENT OF STOMATITIS IN SCHOOL-AGE CHILDREN //Journal of Modern Educational Achievements. – 2023. – Т. 5. – №. 5. – С. 100-103.

