

KIROV MILITARY MEDICAL ACADEMY

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ALEKSEEVA

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CLINICAL JUSTIFICATION OF A SET OF MEASURES FOR THE PREVENTION
OF DENTAL DISEASES IN CHILDREN WITH MENTAL HEALTH DISORDERS

Scientific specialty 3.1.7. Dentistry

Dissertation

for the degree

of Candidate of Medical Sciences

Translation from Russian

Scientific supervisor:

Doctor of Medical Sciences, Associate Professor

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Saint-Petersburg – 2023

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INTRODUCTION

Relevance of the research

Dental caries is one of the most common diseases. According to O.O. Yanushevich (2008), E.M. Kuzmina (2009), dental caries and its complications occupy leading positions in the structure of dental diseases in Russia.

The data from epidemiological studies in 69 countries of the world indicate an increase in the number of neuropsychiatric disorders from 35.4 to 119.9 cases per 1000 population. E.V. Makushin and N.K. Demcheva (2019) found out that in 2018 there was an increase in morbidity rates for two nosological forms: psychosis – by 73.0%, schizophrenia – by 6.5 %. In the period from 2014 to 2018, the incidence of autism in Russia increased by 107.1%, and in 2018 amounted to 110.87 per 100,000 people, which is almost twice as high as the incidence of autism in 2014 – 53.53 per 100,000 inhabitants. There is also an increase in the incidence of mental retardation by 6.2% in Russia over the period 2014-2018.

According to O.G. Avraamova et al. (2020), when examining 91 children living in a boarding house in Moscow, a high intensity of dental caries was revealed and the average index of the CFE was 28 points. Among the examined, periodontal tissue damage was detected, the average severity of gingivitis prevailed in both study groups and was noted in 89.74% and 86.58% of cases in groups of 12- and 15-year-olds.

The degree of the research topic elaboration

Due to the growing number of children suffering from certain neuropsychiatric diseases, the need for dental care is also increasing. Therefore, a number of authors highlight the issues of the characteristics of the state of the oral cavity and the provision of dental care to patients with neuropsychiatric disorders (Yu.M. Maksimovsky et al., 2009; N.O. Savichuk et al., 2011; E.N. Anisimova, E.A. Erilin,

2014), in particular, with mental retardation (E.M. Kuzmina et al., 2008; S.E. Osmanov, 2010; M.Kh. Huseynova, A.Ch. Pashaev, 2013; Yu.V. Skripnik et al., 2016 and others), Down's syndrome (E.O. Ivanova, S.V. Dyakova, 2008; E.A. Oleinik et al., 2013; C.M. Areias et al., 2011; S.A. Al- Maweri, 2014), autism (I.-G. Al Mochamant, et al., 2015; M.G. Cagetti et al., 2015; S.A. Cermak et al., 2015).

However, the prevalence of dental diseases in children suffering from neuropsychiatric disorders, the effectiveness of their use of oral hygiene products, methods for preventing dental diseases and preparing these patients for visiting a dentist have not been sufficiently studied.

The research purpose:

Based on the study of the prevalence and intensity of dental diseases, assessment of behavioral reactions, to develop a set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders.

The research objectives:

1. To study the prevalence of dental diseases in children of Primorsky Krai with some neuropsychiatric disorders (mental retardation, autism, schizophrenia), as well as in children without mental health disorders.

2. To investigate saliva pH and oral hygiene in children with certain neuropsychiatric disorders and in mentally healthy children.

3. To evaluate the behavioral reactions of children with certain neuropsychiatric disorders when visiting a dentist and the possibility of their correction through educational activities.

4. To develop a set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders and evaluate the effectiveness of its use.

Scientific novelty of the research

The prevalence of dental diseases in children of Primorsky Krai has been studied for the first time, a comprehensive dental examination of children with some neuropsychiatric disorders has been conducted. It is proved that in children with some neuropsychiatric disorders, the prevalence and intensity of dental diseases are higher than in mentally healthy children.

For the first time, a comparative study of the state of saliva pH and oral hygiene in children with mental retardation, autism and schizophrenia has been conducted.

For the first time, a scale for assessing the behavioral reactions of a child at a dentist's appointment has been developed. A comprehensive assessment of the behavioral reactions of children with certain neuropsychiatric disorders before dental manipulations has been carried out and the possibilities of their correction have been studied.

For the first time, a set of educational and therapeutic and preventive measures has been developed to prevent the development of oral diseases in children with certain mental health disorders. The effectiveness of this set of measures for the prevention of the development and progression of oral diseases in children with certain neuropsychiatric disorders has been proven.

Theoretical and practical significance of the research

The data on the prevalence and intensity of dental diseases that are important for the organization of dental care for the children of Primorsky Krai have been clarified.

The developed scale for assessing the behavioral reactions of a child and a set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders have been introduced into clinical practice.

The results of the study are included in the program of the discipline “Pediatric Dentistry” for the students in the specialty program of “Dentistry” of the Federal State Budgetary Military Educational Institution of Higher Education “S.M. Kirov Military Medical Academy” of the Ministry of Defense of the Russian Federation.

Methodology and methods of the dissertation research

The dissertation research is based on the scientific works of Russian and foreign dentists on the prevalence, prevention and treatment of oral diseases, as a theoretical and methodological basis.

The object of the study is the organs and tissues of the oral cavity of children suffering from certain neuropsychiatric disorders, as well as medical documentation. The subject of the study is morphofunctional changes in organs and tissues of the oral cavity in children with neuropsychiatric disorders.

In the course of the study, dental and clinical psychological examination of patients, statistical processing of the results obtained were carried out. The human study was conducted with the permission of the Independent Ethics Committee at Military Educational Institution of Higher Education “S.M. Kirov Military Medical Academy” (Protocol No. 221 of April 23, 2019).

The dissertation research was carried out according to the plan of scientific research of Military Educational Institution of Higher Education “S.M. Kirov Military Medical Academy”.

The main dissertation provisions submitted for the defense

1. The prevalence of dental diseases – caries of temporary and permanent teeth, chronic catarrhal gingivitis – in children of Primorsky Krai suffering from some neuropsychiatric disorders (mental retardation, autism, schizophrenia) is significantly higher than in mentally healthy children ($p < 0,05$).
2. The level of oral hygiene in children with some neuropsychiatric disorders is assessed as very poor with an average oral hygiene index of 3.81 ± 0.72 points and a reduced ($p < 0.05$) average saliva pH (6.18 ± 0.16), while in mentally healthy children the level of oral hygiene is characterized as satisfactory with an average oral hygiene index value of 1.75 ± 0.41 points and a higher ($p < 0.05$) average saliva pH value ($7,12 \pm 0,16$).
3. The primary assessment of behavioral reactions of children without mental disorders according to the developed Scale of assessment of behavioral reactions of the child was 9-16 points, which significantly ($p < 0.001$) differs from the indicators of children with neuropsychiatric disorders (120 children out of 123 – from 0 to 2 points, which characterizes the behavior of patients as unsatisfactory). Conducting training activities contributes to achieving satisfactory behavior of children with certain neuropsychiatric disorders (9-11 points) after 6 months and the possibility of dental manipulations.
4. The use for 18 months of the developed complex of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders contributes to reducing the intensity of the carious process to an average of $52.9 \pm 1.6\%$ compared with the control group and reducing the intensity of inflammatory periodontal diseases according to the CFE index to an average of 2.04 ± 0.15 points.

The degree of reliability of the research results

The reliability of the results of the dissertation research is determined by the representativeness and sufficient volume of the studied material, the use of modern research methods, as well as the use of adequate statistical methods for processing the information received.

Research results implementation

The results of the study are implemented in the practical activities of the KGAUZ “Artemovskaya SP”, used in scientific and pedagogical processes at the School of Biomedicine of the Far Eastern Federal University and the Department of General Dentistry of the Federal State Budgetary Military Educational Institution of Higher Education “Military Medical Academy after S.M. Kirov” of the Ministry of Defense of the Russian Federation

Research results approbation

The scientific materials of the study were presented at the All-Russian Scientific and Practical conference “Topical issues of Maxillofacial surgery and Dentistry” (St. Petersburg, 2019), the scientific conference “School of a Young scientist” of the Ural Branch of the Russian Academy of Sciences (Yekaterinburg, 2019), the XVIII International Scientific and Practical Conference (North Charleston, USA, 2019), International Conference on Business Economics, Engineering Technology, Medical and Health Sciences (Morrisville, USA, 2019).

Publications

Seven printed scientific papers have been published on the topic of the dissertation, three of them in scientific publications recommended by the Higher Attestation Commission under the Ministry of Science and Higher Education of the Russian Federation.

Author's personal contribution to the research

The author formulated the purpose and objectives of the study, developed the design of the study, independently reviewed domestic and foreign literature on the subject of the study, conducted a dental examination of patients, processing of the data obtained. The author personally treated children, formulated conclusions and scientific provisions, prepared and decorated the text and illustrative material of the dissertation. The author's personal contribution to the study is more than 90%.

Structure and scope of the dissertation

The dissertation is presented on 180 pages of typewritten text, consists of an introduction, five chapters (a review of literature, materials and research methods, studies of the oral cavity in children with certain neuropsychiatric disorders, the results of clinical and psychological research, evaluation of the effectiveness of a complex of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with some mental health disorders and its discussion), conclusions, practical recommendations. The list of references includes 159 sources, including 118 domestic authors and 41 foreign authors. The dissertation contains 14 tables, 30 figures, 5 appendices.

CHAPTER 1. DISEASES OF THE ORAL CAVITY IN CHILDREN WITH NEUROPSYCHIATRIC DISORDERS (LITERATURE REVIEW)

1.1. Epidemiological and structural characteristics of neuropsychiatric disorders in children in Russia and Primorsky Krai

According to WHO, 16% of the total number of diseases in children in the age group of 10-19 years are cases of mental health disorders. According to WHO statistics, in 2022, diseases of the mental sphere can take a place in the top 5 most common diseases. The growth of patients with mental health disorders can cause serious damage to the economies of countries, reduce the level of social development and the number of labour citizens. The incidence rate in Europe is steadily increasing and, accounting for up to 15% of the total incidence, is in third place after pathologies of the cardiovascular system and oncological diseases. Up to 4 million people with schizophrenia are registered in European countries, about 7 million people with registered cases of Alzheimer's disease and other types of dementia, and more than 100 million people suffer from depression and other psychoemotional disorders. Taking into account all the factors that can lead to the further progression and growth of neuropsychiatric diseases, WHO in 2013 approved the program "Mental Health Action Plan 2013-2030", the main goal of which was to strengthen mental health [137].

Suicide is one of the most common outcomes of a mental health disorder.

The largest number of countries is concentrated in Europe – 9 out of 10 countries with high suicide rates. Every year in Europe, the cause of death of about 150 thousand people is suicide. About 80% of the total number of suicide cases in Europe is accounted for by the male population. Suicide, as the cause of death of the European population aged 15 to 35 years, is in second place after road accidents [14].

About 40% of the population of the Russian Federation have mental disorders of various degrees of severity. Approximately 17% -21% of all psychological health disorders are related to bulimia, anorexia and other eating disorders, 3.1% of Russians have schizophrenia, and 7% have bipolar affective disorder, and 10% of the population

has been diagnosed with depressive disorder. Most of the mental health disorders are registered at a young age from 18 to 28 years, directly reducing the level of labour citizens in the country [42].

In Russia, according to the Ministry of Health, from 2000 to 2018, the increase in the incidence of neuropsychiatric disorders among children under the age of 14 years was 2693.4 per 100 thousand, among adolescents from 15 to 18 years, this figure was 4764.8 per 100 thousand [42, 43].

A number of authors note the peculiarities of the distribution of neuropsychiatric disorders among the child population in a number of regions. It is worth noting that among all the factors affecting the development of neuropsychiatric disorders, it is impossible to single out one of the most important. The causes of neuropsychiatric disorders, in addition to the genetically determined factor, include the cultural level of development of the region, the socio-economic situation, meteorological conditions, as well as the level of organization and quality of psychiatric care [38].

In the Russian Federation, in the period from 2000 to 2018, the indicators of general childhood morbidity increased in six nosological forms: the level of mental retardation (due to an increase in the level of psychoses and dementia) increased by 73.0%, the incidence rate for schizophrenia, schizotypal disorders and schizoaffective psychoses increased by 6.5%, 332.7% and 59.7%, respectively, and the incidence of chronic inorganic, childhood psychoses increased from 7.6 to 117.68, i.e. increased by 1438,1 %. The prevalence rate among the Russian child population also increased for autism by 107.1% in the period from 2014 (incidence rate 53.53) to 2018 (incidence rate 110.87) [89].

The Ural Federal District is among the most unfavorable regions in terms of the prevalence of mental illnesses among the child and adolescent population. During the period from 2001 to 2007, the incidence of children increased by 14.8 cases per 100 thousand children. The incidence of neuropsychiatric disorders among adolescents also remains one of the highest in the country and has increased over the mentioned period by 12,3%.

It is worth noting that a consistently high level of morbidity among children is registered in the Sakhalin region (3353.8 per 100 thousand children) and the Altai Territory (1955.5 per 100 thousand children). When analyzing data on morbidity among adolescents aged 15-17, high rates are observed in the Kemerovo (3253.7 per 100 thousand children) and Sakhalin (2864.5 per 100 thousand children) regions.

However, it is worth noting that in the Southern Federal District, the incidence of neuropsychiatric disorders among adolescents aged 15-17 decreased by 31.7%, positive dynamics is observed in the Northwestern and Siberian Federal Districts [33].

Unfavorable dynamics of the prevalence of mental illness was noted in the Primorsky Krai. For example, in the period from 2016 to 2018, the number of primary neuropsychiatric diseases increased by almost 44% and amounted to 955.8 per 100,000 inhabitants, which is 39.5% higher than the average for the Russian Federation, and 8.9% higher than in the Far Eastern Federal District. In the Primorsky Krai in the period 2016-2018 there is an increase in primary morbidity for such nosological forms as mental disorders of a non-psychotic nature. And in just a year, the value of this indicator reached 2463.6 per 100 thousand of the population against 2512.5 per 100 thousand of the population in 2017, and for primary pathologies, the indicator of general morbidity increased by 7,9% [40].

It should be noted that the increase in the total number of cases in 2018 in Primorsky Krai is due to an increase in indicators for two age groups: the adult population and the child population up to 14 (inclusive) years.

The indicator of primary mental morbidity of children and adolescents aged 15 to 17 years for the period from 2016 to 2018 increased from 653.9 to 1001.4 per 100 thousand population, i.e. the increase in morbidity is 53.1%. In the same age group, there is an increase in the rates of schizophrenic spectrum disorders and in the period from 2015 to 2018 increased from 22.5 per 100 thousand population to 23.8 per 100 thousand population. The rate of increase in mental illnesses of a non-psychotic nature in the age group of 15-17 years in 2018 is 86.3%, i.e. the increase in overall morbidity is due to an increase in indicators for this nosological form of mental health disorders [33, 72].

From 2016 to 2018, there has been an increase in the incidence of autism in the Primorsky Krai in the age group of children under 14 years and in 2018 the growth rate was 162,3%. [78].

According to the World Psychiatric Association, the bulk of mental problems begin in childhood, and in 50% of cases these problems manifest at the age of 15 years, and in 75% of cases up to 18 years [101, 137].

1.2. Prevalence of dental caries and methods of prevention of dental diseases

According to WHO, dental morbidity in Russia remains at a high level, both in adults and children, and amounts to 100% and 80-90%, respectively [3].

It should be emphasized that the key age groups that make it possible to assess the prevalence of diseases on a population scale are the age groups of 6, 12, 15, 35-44, 65 years and older [1, 4].

The studies conducted on the territory of the Russian Federation have shown the highest prevalence of dental caries in children aged 6, 12 and 14 years. Thus, according to I.N. Kuzmina (2008), when examining children aged 6 years, the increase in the intensity of the carious process was up to 52.5% (DMF 0.3-0.9) [54, 55, 56].

In Japan, these indicators for this age category are much higher – an increase in the intensity of dental caries of 78% (DMF 3.7–5.0). By the age of 7, according to the results of studies by various authors, dental caries is found in 60% of the examined children (DMF 0.8–1.5). By the age of 12, a new peak of dental caries disease is observed. According to various authors, the prevalence of dental caries in this age group reaches from 60% to 80%, and according to the results of a study by E.M. Kuzmina (2015) – up to 98% [56].

As a result of the studies conducted in Italy, the prevalence of dental caries in 12-year-olds was 43%, in the USA – 67% [99].

In 2000, when conducting an epidemiological study in Ukraine, experts came to the conclusion that the prevalence of dental caries at the age of twelve is 80.7%, DMF

3.5–5.0. The percentage of caries prevalence in different regions of Ukraine was different: the western regions of the country the prevalence of dental caries reaches 93–100%, and the intensity (DMF) is 3.4–6.5; the central and southeastern regions the prevalence of 86–93% and 73–83%, respectively, and the intensity - 2.9–4.3 and 2.0–3.4 points, respectively. The capital could not please with the results of the survey either, in Kiev, the prevalence of caries in children was 90.2%, DMF is 4.08 points. The data from a 2000 study indicates a high prevalence of dental caries in the country [45].

In twelve-year-old children living on the territory of Belarus, the intensity index of the carious process reaches 90%, and the DMF index is 3.8 points. A similar situation is observed in Russia. Among 12-year-old children living in our country, the prevalence of dental caries ranges from 61% to 96% with a DMF of 2.1–6.6 points. For example, in Novosibirsk, dental caries was detected in 80% of children, in Moscow and St. Petersburg - in 81% and 90%, respectively, and in Sochi, Omsk, this figure is over 90% [49, 53].

An extensive study was conducted in 2005 in Khabarovsk. 840 children aged 7 to 15 years were examined. The highest indicator of the DMF index in 7-year-old children was 6.86 points. At the age of 12 and 15 – 4.72 and 6.64, respectively [57, 64].

Studies of the dental status of children in Saratov and the Saratov region in the period from 2007 to 2012 revealed the following: the highest intensity of dental caries (DMF 4.6 points) is observed at the age of 16–17 years, the prevalence of dental caries was 94.2%; in children under the age of 6, DMF was 4.4 points and the prevalence of the disease was 70% [64, 66].

The DMF index in Sweden was 1.5, in England – 1.4, in Denmark – 1.3, Finland – 1.2, the Netherlands – 1.1 points, which indicates the achievement of the WHO goal to improve the health of the oral organs [98].

Many countries have achieved positive results in the fight against dental caries thanks to the introduction of preventive measures. The use of fluoride medications plays a leading role in the prevention of dental caries. As is known, the fluorine ion,

embedded in the structural unit of enamel – hydroxyapatite crystal – forms fluorapatite, which is most resistant to destruction, thereby increasing the resistance of enamel to caries factors [5, 129].

Fluorides, by inhibiting the action of carbohydrate metabolism enzymes, reduce the breakdown of carbohydrates, which means they have a negative effect on the growth of pathogenic microflora of the oral cavity, act on the protein phase of enamel, enhance the remineralizing potential of saliva [125].

Taking into account the undoubted role of fluoride in the prevention of dental caries, dental caries prevention programs based on its use are being developed and successfully implemented in many countries. One of the safest, simplest, most efficient and low-cost method is water fluoridation. For the first time, water fluoridation has been used in the USA since 1945, since 1966 – in most developed countries. According to various sources, the introduction of this method of prevention in our country contributed to a decrease in the prevalence of dental caries from 45% to 40% over a 6-year period [134].

It was found that centralized fluoridation of water reduces the intensity of dental caries by 0.95 [51]. The fluorine concentration should be calculated taking into account the climatic and geographical features of the region. According to some authors, in Hong Kong, the concentration of fluoride was adjusted without fluorosis from 1 to 0.5 mg/l. The optimal is considered to be 1 mg / l, and in hot climates 0.7 mg / l. To achieve the maximum effect of fluoridated water, it is necessary to use it regularly since an early age. The studies have shown that the maximum effect was achieved with the use of fluoridated water in children who did not have permanent teeth or were in the oral cavity for at least 2-3 years [119].

The cessation of the use of fluoridated water in Germany after 5 years significantly provided the increase in the carious process in children. In addition to water fluoridation, studies of the anticariotic effect of fluorinated salt have been conducted in Germany and Switzerland [133]. There was a decrease in the prevalence of dental caries by 12%, the intensity of dental caries by 32% when using fluorinated salt for 4 years in Minsk [6, 83].

It is worth noting that the content of fluorides in water in 14 regions of the Russian Federation (including Karelia, Udmurtia, Moscow) is optimal and is 0.7–1.2 mg / l, in 11 regions (Nizhny Novgorod, Penza regions) increased – more than 1.2 mg /l, in other regions below the norm – less than 0.7 mg / l. The prevalence of dental caries is higher, the lower the fluoride content in the water [30, 79].

The literature contains data on the introduction of medications containing fluoride and the effectiveness of these measures. The indication for the appointment of tablet forms of fluorides is the high intensity of dental caries. According to WHO recommendations, in order to prevent caries of temporary teeth, sodium fluoride should be prescribed since 6 months. The use of fluoride-containing medications for up to 7 years, according to various authors, reduces the incidence of dental caries by 39-80%. The fluorine preparation “Vitaftor” has proven itself well. Positive results in the prevention of dental caries can be achieved by creating a reserve of fluorides in the oral fluid and their constant content in the oral cavity [79].

The most effective is the local injection of fluoride by electrophoresis [128]. During electrophoresis, fluorine medications must be injected from the cathode. In this case, it is desirable to conduct electrophoresis of 10% calcium gluconate solution or 5-10% acidified calcium phosphate solution from the anode, since fluoride prevents the removal of calcium from the enamel of teeth [135].

In 80% of cases, caries occurs in the fissures, pits and grooves of the teeth. Therefore, in some cases, sealing of tooth fissures is used. This procedure is painless, often does not require the use of a drill, which is especially important when working with children. It should be noted that the procedure for sealing the fissures of teeth is recommended to be carried out no later than 6-12 months after eruption in both removable and permanent dental occlusion [131].

The issues of prevention of dental caries are impossible without studying the calcium metabolism in the child's body. Calcium and phosphorus form the mineral basis of teeth and are contained in the form of calcium fluorophosphate apatite $[\text{Ca}_5\text{F}(\text{PO}_4)_3]$. Calcium is in a free (ionized) state and makes up 55% of its total amount, is bound with proteins in the amount of 30%, and 15% of calcium is bound

with anions, phosphates, citrate, etc. The level of total plasma calcium is normally 2.35 - 2.75 mmol / l, and by the age of 14, the level of the ionized form of calcium is in the range of 1.007–1.29 mmol / l. However, biochemical studies in 6-year-old children have shown a decrease in mineral metabolism, that is, calcium, phosphorus. This indicates the imperfection of calcium-phosphorus metabolism in children of this age group. And, as it is known, only with a normal content of calcium and phosphorus in the blood serum, the full formation of hydroxyphosphates occurs, respectively, for the full mineralization of teeth, it is necessary to prescribe medications containing calcium and phosphorus [10, 16, 17].

Children, as well as adults, need microelements and vitamins for the normal development and growth of the body. However, the daily consumption rate of such a microelement as calcium in children above depends on the age and is: 1-6 years – 1000mg; 7-10 children – 1200mg; 11-13 years – 1500mg, 14-17 years – 1400mg. Insufficient intake of calcium in children for a long time may be unnoticeable and have no manifestations. But in order to ensure the normal functioning of organs and systems, to normalize the level of calcium in the blood, the compensatory mechanisms of the child, being depleted, “wash out” calcium from teeth and bones. The process of removing calcium from teeth and bones has negative consequences in children, for example, violating the integrity of the structure of tooth enamel and hydroxyphosphates, leads to tooth destruction, impaired mineralization of tooth tissues, and from the bone tissue can lead to impaired growth and development of the skeleton as a whole. Studying the prevalence of the carious process in children 3-6 years old, I.V. Kovach et al. (2011) established an inverse correlation between bone mineral density and the intensity of the carious process [20].

Based on the research of many domestic and foreign authors, it can be concluded that it is necessary to prescribe medications containing calcium for the prevention of dental caries, normalization of the development of the bone system as a whole. The vitamin and mineral complex “Caltsinova”, approved for use from the age of 2, has proven itself as a medication that contributes to an increase in the concentration of calcium in the oral fluid within three months after application from

0.98 to 1.27 mmol / l, which means it increases the remineralizing potential of the oral fluid, contributing to an increase in enamel resistance - as evidenced by enamel resistance test data (the indicator decreases from 6.57 ± 0.18 to 4.96 ± 0.25).

The conclusions drawn on the basis of a two-year study of the carious process in children aged six years prove the high effectiveness of the use of "Caltsinova": the increase in the intensity of the carious process was 0.96, and the reduction of dental caries was 68.4%. After three months of using the medication "Caltsinova", it was possible to restore the enamel of teeth at the initial stage of the development of the carious process in 90% of cases. The decrease in the enamel resistance test index from 7 to 5, as well as the absence of new carious cavities in patients aged 12-15 years, proves the effectiveness of the use of the vitamin and mineral complex "Caltsemin Advance", which favorably affects the processes of tooth enamel restoration [76, 81].

The level of calcium and phosphorus in the blood plasma depends on the normal level of hormones such as parathyroid hormone and thyrocalcitonin, as well as vitamin D and the coordinated work between them. As recommended by the US National Institutes of Health, from 200 to 400 IU / day is the norm of vitamin D intake for children and adolescents. When prescribing the medication "Videhol" (D₃) in a solution of 0.25%, a decrease in the prevalence of dental caries was revealed by 3.3 times, the CPI index – by 1.5 times [136].

The role of local oral immunity in the prevention of dental diseases cannot be ignored. According to some authors, sodium nucleinate has an immunomodulatory and stimulating effect of phosphorus-calcium metabolism [19].

According to the recommendations of the authors of the study, the appointment of the medication "Imudon" from 3 to 8 tablets a day (depending on the degree of activity of dental caries) for 3-5 weeks, leads to a reduction of the carious process in 3 years of research by 50% in 12-year-old children [26].

However, at present, parents, fearing for the health of the child, often ignore the appointment of tablet forms of fluoride for children. The way out in this situation can be toothpastes, gels and mouthwashes with fluoride content. The use of toothpastes

containing sodium monofluorophosphate, calcium can reduce the increase in dental caries by 2.5–3 times [25].

The studies by some authors have shown that the use of toothpastes with calcium and xylitol increases the acid resistance of enamel, 28% of children who used this toothpaste acquired a high level of enamel resistance [20, 23].

The positive results of using sodium fluoride solutions in various concentrations were demonstrated in their studies by E.M. Kuzmina et al. (2016): the increase in the intensity of the carious process in children aged seven years decreased to 32.2% with the use of 0.2% sodium fluoride solution for 2 years; and the caries reduction rate was 26.5% after the use of 0.1% sodium fluoride solution [55, 56].

The use of fluoride-based rinses can be combined with the use of toothpastes and gels. The preventive effect of the use of fluorinated gels has been studied in many countries. For example, the data of foreign authors revealed a reduction in the increase in the intensity of the carious process by 34.3%, using APF gel locally [69, 70, 100].

E.M. Kuzmina (2016) revealed a reduction in the growth of dental caries by 46.5% in children using 2% fluoride gel for two years [77, 78]. 20% reduction of dental caries growth was provided by the use of 1% -2% sodium fluoride gel on 3% agar, which was proposed by V.K. Leontiev (2006) [55].

In addition to prevention schemes that children can use at home under the supervision of their parents, dentists are armed with such professional fluoride-containing medications as fluorolac, sealants. The effect of sealants is to release substances that contribute to the remineralization of tooth enamel by isolating fissures. This method reduces the prevalence of dental caries in children by up to 80%. Fluoride-containing pills that are fixed on the chewing surfaces of molars can serve as a source of continuous fluoride release into the oral cavity and maintain a sufficient level in the oral fluid [194, 200].

Remineralizing therapy according to the method of E.V. Borovsky and P.A. Leus (1989), which combines the use of a ten percent solution of calcium gluconate with a two percent solution of sodium fluoride, has become widespread. The effectiveness of the anti-carious effect of this method is up to 24%, subject to the

authors' methodology [7]. The use of a 3-6% solution of "Remodent" allowed to reduce the increase in caries to 50% during a 3-year follow-up [17].

However, most calcium-phosphate complexes contain complex chemical compounds of calcium and phosphorus, which do not penetrate the tooth enamel well. This feature prompted researchers to create new remineralizing gels in which calcium and phosphorus would be in an ionized state and penetrate into the tooth structure in greater quantities. Some researchers have suggested the use of such gels. Gels "Enamel", "Saliva" contain calcium and phosphorus in different concentrations: for example, the use of neutral preparation "Saliva" reduces the prevalence of caries by 86.6%, and neutral gel "Enamel" – by 76.5% [44].

In addition to prescribing medications, proper nutrition plays an important role in the prevention of dental diseases. The amount of carbohydrates consumed plays a huge role in the occurrence of dental caries. Carbohydrates, lingering in the contact points of the teeth, serve as a medium on which bacteria grow and multiply. An increase in the number of bacteria in the oral cavity leads to a change in the pH of saliva and oral fluid, which in turn reduces the mineralizing ability of oral fluid and contributes to the process of demineralization of teeth and the occurrence of caries. WHO recommends that children under 3 years of age consume 30-40 g of carbohydrates per day [7].

Sucrose is a carbohydrate with the most pronounced cariesogenic property. According to the data of domestic and foreign researchers, the reduction of the increase in the intensity of the carious process is 1.5 times lower when the carbohydrates consumed are limited to 30 g per day [91, 108]. In the UK and Western European countries, the consumption of sucrose in the diet is up to 83%, in turn, in the USA, sucrose has recently been increasingly replaced with fructose. As a result of such a replacement, it was possible to significantly reduce the increase in the incidence of dental caries [126].

Sweeteners stimulate the function of the salivary glands, increase the content of electrolytes in the oral fluid, thereby reducing the formation of dental plaque. One of the most common, natural and safe sweeteners is xylitol – $\text{CH}_2\text{OH}(\text{CHOH})_3\text{CH}_2\text{OH}$.

Xylitol, contained in vegetables and fruits, and also unlike other sugars, consists of five carbon atoms. It is the difference in the chemical structure of xylitol, being absorbed much slower than hexatomic carbon, that prevents the growth and reproduction of bacteria, including *Str. mutans*. The mechanism of xylitol is to reduce the production of dextran, a substance that promotes the formation and attachment of plaque to the teeth, by the bacterial cell. In addition to reducing the concentration of dextran in saliva, xylitol competes with other sugars in metabolic processes inside the cell, as well as in the process of transmembrane transfer. *Str. Mutans*, splitting xylitol, consumes energy, but does not release it, respectively, xylitol modules the growth and reproduction of bacteria. In addition, by increasing the buffer capacity of saliva, xylitol helps in the processes of enamel remineralization [11, 18, 97].

Developed by Dr. Ray Wagner, USA, Spiffies wipes for oral care in young children are impregnated with xylitol and have proven their effectiveness in preventing the occurrence of the carious process. The mechanism of action of the wipes is not only the mechanical removal of plaque, but also form an environment in the oral cavity that adversely affects the growth and reproduction of pathogenic microflora [105].

One of the promising methods of prevention of dental caries is the method of laser radiation using the "Optodan" device. The essence of the method is the restructuring of the crystal structure of enamel under the influence of laser light, thereby stimulating remineralizing processes and increasing resistance to caries agents. Under the influence of laser light, hemo- and lymphocirculations in the pulp are enhanced, the secretory function of odontoblasts is activated, salivation and the ratio of inorganic and organic fractions are normalized. The introduction of this method into the complex of measures for the prevention of dental caries in Perm for 3 years allowed to reduce the increase in dental caries by 67% [22].

Currently, the latest technologies are also in demand, which make it possible to identify and promote the remineralization of the carious process at the early stages of development. The operation of this technology is based on the principle of modeling the pH of plaque when using arginine, which affects non-pathogenic arginolytic microorganisms. These bacteria are able to break Down's arginine to ammonia, which

in turn neutralizes plaque acids, thereby contributing to the stabilization of microbial biofilm [102, 104]. Since the mechanisms of action of arginine and fluoride complement each other, contribute to increasing the caries resistance of enamel, the latest toothpastes contain both active substances. A clinical study conducted in the USA showed the success of their use [132].

Periodontal tissue diseases in children are not inferior in prevalence to the carious process. According to WHO, the prevalence of inflammatory periodontal diseases in children is 10%, in adolescents – up to 90% [152].

Inflammatory periodontal diseases in children are accompanied not only by local manifestations, but also by general symptoms, such as sleep disorders, fever, general malaise and loss of strength, and eating disorders [15]. Prevention of inflammatory and destructive diseases of periodontal tissues involves hygiene training, professional dental cleaning by a dentist, and also consists in the treatment of orthodontic pathology and the selection of individual oral care products [39].

G.A. Dovbnya et al. (2018) examined 38 children, of whom 18 children suffered from chronic catarrhal gingivitis. During the study, the children were prescribed applications of a mixture of essential oils of mint, pine, fennel, eucalyptus in combination with bentonite clay. The remaining 20 subjects were prescribed standard treatment. The authors proved that the activation of local immunity is more pronounced in children after the use of a complex of essential oils [37].

Thus, the combination of local and general prevention, nutrition adjustment, and improvement of the body as a whole can reduce the prevalence of dental caries.

1.3. Features of oral diseases in children with neuropsychiatric disorders

It is known that the human body is a complex biological system in which all organs and processes, being closely interconnected, work together harmoniously. The first clinical signs of diseases of most organs and systems are lesions of the oral cavity.

However, the occurrence of dental caries and other diseases of the oral cavity are often provoked by taking medications. For example, antipsychotic medications are used to treat children suffering from schizophrenia. One of the side effects of the medications is a decrease in the function of the salivary glands, which entails the occurrence of xerostomia and increases the risk of dental caries. Patients forced to take antipsychotic medications for more than 3 months may suffer from tardive dyskinesia, which leads to a decrease in the quality of tooth brushing and an increase in the risk of oral diseases [41].

The leading local etiological factor causing the occurrence of dental caries and periodontal diseases is plaque. Given the underlying disease, patients have reduced motivation for oral hygiene, which is manifested by abundant plaque and, as a consequence, periodontal damage [46, 50].

Plaque fixation is observed more often on the proximal and crown surfaces of parts of the teeth, in the pits and fissures of the teeth. In the dental spaces, fixation of soft plaque can be observed [60, 63].

The release of cytokines and, as a consequence, the occurrence of cellular infiltrates trigger a cascade of reactions in periodontal tissues, leading to inflammatory periodontal diseases, which are characterized by hyperemia, tissue edema, bleeding gums and interstitial papillae. Lipopolysaccharides, as products of an inflammatory reaction, closing a vicious circle, cause immunological reactions both at the local and general level, which is manifested by inflammatory and destructive phenomena in periodontal tissues [95, 101, 108].

Microorganisms, bacteria, as well as the products of their vital activity, developing during the inflammatory processes of periodontal disease, have a general effect on the human body. There are four main directions in which the local inflammatory reaction spreads – bacteremia, systemic dissemination, aspiration of bacterial contents into the organs of the respiratory system, as well as an autoimmune response that occurs under the influence of inflammatory mediators. A number of authors have identified the ability of intestinal bacteria, as well as *Pseudomonas aeruginosa*, *Staphylococcus aureus* to colonize teeth. In addition, inflammatory factors

such as cytokines, which are produced by periodontal disease and enter the underlying parts of the digestive tract with saliva, negatively affect the body [91, 95, 98].

Plaque leads not only to the appearance of a chronic inflammatory process in periodontal tissues, but also contributes to the destruction of the alveoli of the tooth, weakens the ligamentous apparatus of the periodontal and ultimately leads to tooth loss, besides, increased synthesis of cytokines and antibodies negatively affects the overall condition of the whole organism [64, 74].

The authors, who studied the dental morbidity in children with mental retardation of varying severity, found a high prevalence of the carious process [79, 80, 81]. A number of authors have concluded that the prevalence of periodontal tissue diseases in children with mental retardation is up to 54.3% [82].

The intensity of dental caries in children aged 14, according to N.V. Tarasova (2014), averages 3.1, and the maximum values of the DMF index of 4.0–4.4 points were recorded in children aged 7-8 years [83, 84]. In her study, M.H. Guseynova (2013) revealed that the frequency of dental caries in children of various age groups with mental retardation was 97.9–100%, and the DMF index ranged from 5.09 ± 0.47 to 6.53 ± 0.59 points [30].

A number of dental problems have been identified by foreign authors in children with Down's syndrome [103, 112]. According to their data, the prevalence of caries of permanent teeth among them is 47.8%. In addition, there is a high prevalence of periodontal tissue diseases in children with Down's syndrome (47-53% of the examined children). In addition, such children have a delay in teething, anomalies of the position of teeth in the dentition, microdentism. 15.3% of children were diagnosed with systemic hypoplasia of tooth enamel.

The authors attribute the high prevalence of the carious process, as well as periodontal diseases in children with Down's syndrome, to a feature of behavioral and hygienic skills, reduced motor functions and poor hand coordination, genetic predisposition, a decrease in the buffer capacity of the oral fluid and a violation of the composition of the oral microbiota [115].

Schizophrenia is a disease that occurs with psychotic episodes that significantly change the behavior of the patient, the perception of the surrounding world [5,12].

Unfortunately, schizophrenia in many patients occurs against the background of somatic diseases, metabolic disorders, lesions of the central nervous system. The behavior of patients with schizophrenia is often characterized by a complete lack of motivation to observe personal hygiene. In addition, in the treatment of schizophrenia, medications are used that can reduce the function of the salivary glands, which, in turn, promotes the growth and reproduction of pathogenic microorganisms, the spread of inflammatory and destructive processes in periodontal tissues. For example, S.A. Butaeva et al. (2005), found that the intensity of dental caries in patients with schizophrenia is twice as high as in patients without mental illness, and the DMF was 21.56 ± 0.81 points [13]. The authors noted a high prevalence of periodontal lesions – 92%, and in 7% of cases there were inflammatory periodontal diseases with a periodontal pocket depth of 6 mm [9, 15].

One of the diseases that makes up the association of pervasive developmental disorders is autism. The main characteristics of this pathology are: low social level of interaction, detachment from the outside world and people, lack of expressions of emotion, poverty and limited interests [24, 107].

Despite the fact that many scientists are studying the causes that cause and provoke the development of autism in children, there is currently no clear data on the etiology and pathogenesis of autism. The lack of the possibility of carrying out objective research methods, as well as the complex diagnosis of autism often leads to the establishment of an incorrect diagnosis [100, 102, 110].

A number of authors who conducted studies in a group of children with autism, note a low level of oral hygiene [111, 113].

Summarizing the analysis of domestic and foreign literature, we can draw attention to the high prevalence of dental caries in children with neuropsychiatric disorders. At the same time, the diversity and fragmentation in the methods of prevention and treatment, the lack of a single protocol for the management of such patients do not contribute to the provision of dental care to this category of children.

Therefore, the development of effective methods for the prevention and treatment of dental diseases, taking into account all the features of the underlying neuropsychiatric disorder, is relevant.

1.4. The condition of the local immunity of the oral cavity in children

The human oral cavity is a unique biological ecosystem [32, 34]. Since the first days of a child's life, external pathogenic microorganisms, bacteria, viruses tend to disrupt the balance of the biological state of both the whole organism and the oral cavity. However, dentists are rarely found in the practice of patients with lesions of the oral mucosa. Accordingly, there are protective factors in the oral cavity that prevent the spread of infection.

Oral protection factors can be divided into specific and non-specific. The non-specific protection factor is provided by the structural features of the protective epithelial layer. Specific factors of oral cavity protection are represented by T, B- lymphocytes, immunoglobulins.

Among the immunoglobulins present in the oral cavity, IgA, IgG, IgM are the most studied. To date, two forms of IgA are known: secretory and serum. Secretory immunoglobulin A is produced by epithelial cells, it is found in the saliva of a newborn, and by 6 days its content increases by 7 times. With age, the amount of secretory IgA increases. It is known that the main function of secretory IgA is to reduce the adhesion of bacteria, preventing the penetration of viruses through the oral mucosa [44, 52, 106].

A number of authors have established that IgG plays one of the leading roles in the formation of local oral immunity, which promotes intracellular autolysis of bacteria and viruses. Normally, the IgG content in saliva is 1.5 mg/ 100 ml, however, its concentration increases as a compensatory mechanism with a decrease in secretory IgA [114].

The composition of the oral fluid also includes lysozyme and lactoferrin, which have an antimicrobial effect and belong to oxygen-independent systems of direct action on microbial agents. Lysozyme, depolarizing mucopeptides on bacterial membranes, destroys them. Lysozyme also participates in intracellular autolysis of microbes and bacteria. Lactoferrin belongs to the group of iron-containing proteins. By producing α -defenizin, a positively charged cationic protein, it destroys negatively charged bacterial walls, thereby preventing the invasion of microorganisms into the oral cavity [29].

T- and B-lymphocytes contained in the follicles of the tonsils circulate in the oral fluid, protecting against bacterial invasion. In addition, it is known that the gingival sulcus is the place of accumulation of B-lymphocytes [35, 36, 109].

Saliva is a physiological environment with protective and trophic functions. The quality of tooth enamel depends on the ionic composition of saliva, the pH of saliva, which means that when the quantitative and qualitative characteristics of saliva change, the state of the enamel may change [120]. Saliva participates in the regulation and balancing of the processes of demineralization and remineralization, which plays a huge role in the tertiary period of enamel maturation (after teething) and determines the caries-resistant properties of tooth enamel.

A number of domestic and foreign authors note a direct correlation between the rate of salivation and the incidence of dental caries. A decrease in saliva production leads to difficulty chewing food, so patients have to hold food in the oral cavity for a long time, which contributes to the proliferation of bacteria, increased plaque formation. It has been reliably established that medications such as antidepressants, antipsychotics, antiemetics reduce the production of saliva, which means that they can provoke the occurrence of dental caries, inflammatory processes in periodontal tissues. However, patients with mental illnesses should use such medications for life, which gives grounds to include such patients in the risk group for the development of dental diseases [121].

As it is known, saliva in children is saturated with calcium much lower than in adults, and critical pH values in children are 6.27–6.19. Both factors mean that in

children the processes of demineralization and dental caries can begin at higher pH values than in adults. Studies have shown that at a pH of less than 6.2, saliva becomes less saturated with calcium and begins to destroy tooth tissue. According to modern ideas about the occurrence of the carious process, one of the main factors causing the demineralization of tooth tissues is the effect of acids [121, 122].

A number of authors, investigating the functioning of the enzymes of the antioxidant protection of oral fluid, found that in children with mental health disorders, the level of catalase is several times higher than in children without mental illness, and amounts to 93.3–94.7%, which indicates excessive formation of hydrogen peroxide. A high level of oxidation products indicates increased microbial contamination and the risk of developing periodontal tissue disease [123]. There was also a decrease in the level of immunoglobulins and lysozyme in the oral fluid in children with neuropsychiatric disorders, which reduces the functioning of local factors protecting periodontal tissues.

Poor hygiene, which, unfortunately, is characteristic of children with neuropsychiatric disorders, aggravates the process of developing dental caries in them. If the rules for oral care are not followed, a plaque forms on the teeth. A huge number of microorganisms, as well as the products of their enzymatic activity, create an acidic environment, which, acting on the enamel of teeth, destroys it. In addition, children with neuropsychiatric disorders consume large amounts of carbohydrate food, which also aggravates the caries situation. Domestic scientists have found that taking 10 g of sugar leads to an increase in the level of lactic acid in saliva by 10-16 [18].

The composition of saliva and oral fluid in healthy children differs from adults. For example, the saturation of saliva with calcium in children is 0.28–0.31 mmol/l, and a decrease in the pH of saliva to 6.27–6.17 contributes to the development of the processes of demineralization of tooth enamel [65].

It is impossible to exclude the influence of hormones on the content of microelements in saliva and oral fluid. A number of authors note signs of “physiological dishormonosis” in the puberty period. In addition, a number of

hormones affect the rate of saliva secretion and its viscosity, which also affects the condition of the oral cavity [3, 5, 8].

For example, with increased thyroid function, patients have multiple dental caries, the timing of teething is violated. With a lack of thyroid hormone production, the appearance of cervical tooth decay, atrophy of the salivary glands and a decrease in saliva production can be noted. In addition, with hypothyroidism, there is a violation of phosphorus-calcium metabolism, which contributes to the development of caries, non-carious lesions of teeth, inflammatory changes in periodontal tissues [9, 11, 13].

The parathyroid glands regulate the exchange of calcium and phosphorus in the human body. With hyposecretion of parathyroid hormones in childhood, enamel hypoplasia is observed, dentin formation processes are disrupted, inflammatory and destructive changes occur in periodontal tissues [19, 25, 27].

The mucous membrane of the oral cavity can change with an imbalance of sex hormones. For example, progesterone causes increased vascularization, which, in turn, leads to increased bleeding of the gums.

Thus, the peculiarities of local immunity, saliva pH and hormonal changes in the puberty period can contribute to the development of a cariesogenic situation in the oral cavity of a child.

1.5. Clinical characteristics of children with neuropsychiatric disorders

Social and biological factors, anatomically determined changes, genetic changes that are interrelated with each other and influence the course of the disease play a role in the development of mental diseases. However, to date, the causes of many mental illnesses are reliably unknown [29, 36].

For example, scientists still do not have a common understanding of the causes of schizophrenia. Many researchers adhere to the theory of genetic conditioning of the occurrence of the disease. The closer the blood relationship with the patient, the higher the risk of schizophrenia, for example, brothers or sisters have a 10-15% chance of

schizophrenia, grandchildren - 3%. The most convincing arguments in favor of genetic inheritance of schizophrenia were obtained when studying twins, the probability of developing schizophrenia reaches 31%. However, there are families where children do not inherit this disease, which means that genetic conditioning is not mandatory [39].

Proponents of the social theory of the origin of schizophrenia talk about the role of the family in the occurrence of the disease. In their opinion, the child finds himself in a difficult choice between two alternatives, which causes him confusion and intolerance [80]. The inability to choose, the dominance of one of the parents, often accompanied by violence, leads to the emergence of schizophrenia in the child.

The immune theory of schizophrenia is also interesting. According to scientists, the cause of schizophrenia is hidden in the altered immune response of the body, arising from the mechanism of sensitization to protein complexes released from dying neurons of the brain [49, 50, 51].

Recently, there have been more and more supporters of the theory that denies schizophrenia as a nosological form. The followers of this theory suggest that the disease “schizophrenia” does not exist. There are many mental illnesses caused by different reasons, but the brain, not having such a variety of ways to respond to harmful factors, is forced to give the same type of reactions, so the clinical manifestation is the same and, conditionally, called schizophrenia [54, 55].

Despite the reasons that caused the development of schizophrenia, the disease has similarities in the manifestation of psychopathological symptoms in all patients [56].

Symptoms of schizophrenia in early childhood include:

- dreaming delusional content;
- motor and speech disorders;
- sleep and wakefulness disorders;
- refusal to eat;
- the presence of unmotivated and causeless fear.

Auditory hallucinations prevail in children under 11 years of age. For children under 4 years of age, it is almost impossible to establish a correct diagnosis. However,

with the formation of speech and thinking, developmental deviations become more noticeable: illogicality, bipolar weakening of associative connections between concepts. It should also be noted that the early onset of schizophrenia in children causes the pathological development of speech, memory, attention, the skills of social life and self-service are weakened [61].

Despite the presence of symptoms that characterize the disease schizophrenia, the main disorder is a violation of the formation and / or a perverted perception of the “ego”, which can manifest itself in isolation, detachment from others, often a sense of fear and anxiety, loss of interest in yourself and your appearance. The weak “ego” of a child is not able to cope with the increased internal needs, the need to separate from the mother and loved ones, forming their own connections with others, which creates a sense of insecurity in a child and provokes the development of schizophrenia [65].

Recently, the interest of specialists in children with autism has increased. Despite the fact that the first case of autism was described in 1911 by E. Bleuler, the etiology and pathogenesis of the disease are still not fully understood [94].

Isolated descriptions of clinical cases of autism in children appeared in the literature of the 19th and 20th centuries. However, in 1943, the American clinician L. Kanner summarized 11 cases and concluded that there was a special clinical syndrome, calling it “early childhood autism syndrome” [86]. L. Kanner also gave a detailed description of the symptoms characteristic of such children:

- echolalia;
- fear of change and incompleteness;
- development of rituals;
- extreme loneliness;
- preference for communication with inanimate objects.

Austrian pediatrician H. Asperger in 1944, separately from the doctor L. Kanner, gave a description of a clinical case and called it “autistic psychopathy” [42]. According to H. Asperger’s observations the patients were characterized by the presence of the following symptoms:

- early speech development, sometimes even before the start of walking;

- unusual intonation of speech;
- lack of visual contact recreation;
- almost complete absence of facial expressions, gestures;
- lack of social skills.

According to H. Asperger's research disease (1944) the biological defect of affective contact and hereditary conditioning plays a key role in the occurrence of the pathology [47]. "Highly functional autism" is the name of Asperger's syndrome in modern psychiatry, which is considered as a successful course of the pathology: many children, provided proper treatment and psychocorrection, can be in society, are capable of self-care [51].

Only in 1967 S.S. Mnukhin et al. described autism as an organic lesion of the central nervous system. It is known that children with autism also have disorders of biochemical metabolism. However, despite numerous studies in the field of psychiatry, to date, researchers have not agreed on the causes of autism, it is considered that the disease is polyethological [96].

Despite the complexity of the diagnosis of the disease, the number of people suffering from autism and autism spectrum disorders (ASD) is increasing. In the USA, the Center for Control and Prevention (CDC) has been conducting active epidemiological monitoring of the prevalence of ASD among children aged 8 years in 11 states since 2000. According to data from 2016, the prevalence of ASD is 185: 10,000 children aged 8 years, of which 33% of cases have severe mental retardation, 24% have borderline mental retardation, 42% have medium and high intelligence [26] Since 2010, the CDC in the USA has organized epidemiological monitoring of the prevalence of ASD among 4-year-olds. In a report published in 2020, the prevalence of ASD was 156:10,000, of which 53% had mental retardation.

According to the UK National Database, in 2013, the prevalence of ASD among 8-year-olds is 24:10,000 [42].

The data from a pilot project conducted in nine subjects of the Russian Federation since 2017 to the present allow us to establish an indicator of the

prevalence of ASD, and this indicator in 2020 amounted to 18 per 10 thousand children under the age of four [42].

According to data provided by Rosstat, in the period from 2014 to 2018, the incidence of autism in children under 14 years of age increased by 107.1% and amounted to 11 per 10 thousand. The same indicator in this reporting period for adolescents aged 15-16 years increased from 1.8 to 5.78 per 10 thousand adolescents, i.e. increased by 206.4% [26, 42, 62].

Despite the availability of various diagnostic methods, it can be quite difficult to establish the correct diagnosis. First of all, this is due to the complexity of conducting objective studies, since the diagnosis is based on the analysis of the child's behavior. For diagnosis, the most incidence was received by:

1. ADI-R - Autism Diagnostic Interview-Revised – Questionnaire for the diagnosis of autism.
2. ADOS - Autism Diagnostic Observation Schedule – Observation scale for the diagnosis of autism.
3. CARS - Childhood Autism Rating Scale – Evaluation scale of childhood autism.

The ADI-R questionnaire is applied to the parents and/or guardians with whom the child lives. The purpose of this study is to determine the social and communicative skills of a child's development. During the survey, parents need to answer 85 questions, the procedure lasts about 2 hours. Analyzing the data obtained during the survey and interview, the specialist can make specific recommendations for each child [112].

The ADOS methodology is called the “gold standard” in the assessment and diagnosis of autism in children of all ages and levels of development. In the process of assessing behavior, pre-prepared social situations are used in which various autistic disorders manifest themselves. The value of this technique is that it is applicable even for young children.

Depending on the patient's age, level of development, availability of speech and communication skills, one of four modules is used:

Module 1 – for children using separate words, or not speaking;

Module 2 – for children using expressions of two or three words;

Module 3 – children who speak fluently;

Module 4 – children, teenagers who speak fluently.

The diagnostic procedure lasts 45 minutes, and video recording is usually conducted by specialists to eliminate errors. All data is recorded in special protocols. Final grades are given immediately after the test [124].

The CARS evaluation scale is the most widely used methodology for evaluating and monitoring children with autism, it is based on clinical observations of a child's behavior. The scale is used to evaluate children aged 2-4 years. An assessment is carried out for each category of behavior, and then the scores are summed up. It is worth noting that this test is used as a screening test and cannot serve as a basis for diagnosis [127].

In the Russian Federation, by Order of the Ministry of Health of the Russian Federation No. 396n, a two-level screening of mental development disorders in early childhood was introduced:

The first level of screening is a questionnaire of parents of children at a pediatrician's appointment. If the results of the survey do not reveal a risk group, then the screening ends. The questionnaire developed by the Ministry of Health of Russia is not used for diagnosis, but only reveals the presence of dangerous factors that can lead to the development of psychopathology [13].

The second level of screening (clinical) is carried out by a child psychiatrist in accordance with the legislation of the Russian Federation on a voluntary basis, based on the data of the anamnesis and history of the child's development received from parents or legal representatives, as well as observations of the doctor's behavior of the child. Additionally, data from paraclinical, experimental-pathopsychological and psychometric studies are used [27].

Despite the presence of tests to determine autism and the variety of clinical forms of autism, all children with this pathology are characterized by alienation from

others, the presence of monotonous actions, a decrease in motivation to observe personal hygiene [31].

One of the most common forms of mental illness in children is mental retardation of varying severity.

According to WHO, mental retardation is a congenital or acquired at an early age pathology of development or underdevelopment of the psyche, which is manifested by a decrease in intellectual activity and a decrease in social skills [137].

According to ICD-10, mental retardation is a state of delayed or incomplete development of the psyche, which is primarily characterized by impaired abilities that manifest themselves during maturation and provide a general level of intelligence, that is, cognitive, speech, motor and social abilities [140].

The causes of mental underdevelopment in children include various negative effects on the developing fetus in the prenatal period. Such factors include intoxication, infectious diseases of the mother during pregnancy, hormonal disorders, taking antibiotics. In addition, the rhesus conflict of the mother and fetus leads to the pathological development of the child [35].

One of the factors causing congenital mental retardation and many other malformations of organs and systems is alcoholism of the mother during pregnancy. Fetal “alcohol syndrome” is characterized by microcephaly, bone growth retardation, and muscle weakness [130].

Mental retardation according to etiological factors is divided into two groups arising under the influence of:

- endogenous-hereditary conditions;
- exogenous factors caused by the influence of organic and socio-environmental factors [43].

Mental retardation, which occurs under the influence of various hereditary factors, is characterized by a variety of clinical manifestations due to the influence of etiological causes. The revealed pattern between the disease and the genetic type of inheritance indicates that the leading role in the occurrence of mild oligophrenia belongs to dominant and polygenic hereditary factors, in turn, severe mental retardation is

observed with recessive type of inheritance. Metabolic disorders that underlie the occurrence and development of metabolic diseases play a major role in the pathogenesis of autosomal recessive forms of mental retardation [64].

Pathologies such as Cornelia de Lange syndrome, phenylketonuria, galactosemia, gargoilism are forms of diseases inherited by recessive type. However, diseases such as Marfan syndrome, as an example of hereditary family forms, belong to the dominant type of inheritance, in which there is a similarity of manifestations within the family [64, 71, 96].

The results obtained in the course of the research conducted by A.R. Luria (1962) make it possible to bring into the group of polygenic forms a mild course of mental underdevelopment of children whose parents had a low level of intellectual development and/or a mild degree of mental retardation, successfully compensated in adulthood [56]. The causes of a mild form of mental retardation in children may be deviations in the intellectual development of parents. This statement is based on information obtained as a result of research on the polygenic type of inheritance of temperament, mental and physical abilities in normal. The absence of manifested disorders in both somatic and neurological status, as well as the absence of other etiological factors in children and their parents indirectly confirms the polygenic type of inheritance.

The second group includes exogenous etiological factors that affect the child indirectly through the mother's body during pregnancy or affect the child's brain in the first year of the postnatal period of development. Birth trauma or intranatal hypoxia is considered as one of the factors that play a leading role in the occurrence and development of dementia in a child. Endocrinopathy, blood diseases, kidney diseases, cardiovascular insufficiency and many other pathologies of the mother that occur during pregnancy can cause oxygen starvation and lead to disorders in the development of the fetus. The causes that can lead to birth trauma or oxygen starvation of the fetus are diverse in etiology: from toxicosis and delayed pregnancy, rapid or prolonged childbirth to anomalies in the development of the placenta or improper presentation of the fetus, and others [101, 103, 112].

Infections are one of the leading factors in the occurrence and development of brain pathologies in intrauterine development. The possibility of microorganisms or viruses, in the presence of infectious diseases in the mother, to penetrate through the placenta into the child's body, causes the likelihood of developing pathologies in the fetus, including diseases of the nervous system. Viral infections that have a neurotropic effect on the fetus during pregnancy include infectious hepatitis, rubella, influenza, listeriosis and others.

Medications such as antibiotics, sulfonamides, etc., which were taken by the mother during pregnancy, can provoke the occurrence and development of mental retardation in the child [118,126, 127].

Along with the exogenous effect on the child's brain during pregnancy, neuroinfections such as meningitis or encephalitis play an important role in the postnatal period. Severe traumatic brain injuries, dystrophic diseases, intoxication that occurred in the first year of life can lead to brain damage in a child and provoke abnormalities in the development of the nervous system [132, 134].

One of the exogenous factors that can contribute to the development of mental retardation in a child is the Rh conflict between the fetus and the mother's body according to the factors AB0 and Rh factor [82].

Acquired anomalies in the development of organs and systems, including the central nervous system, arise as a result of the influence of harmful environmental factors, injuries of various etiologies. Such causes include some infectious diseases, for example, meningitis, polio, encephalitis. Unfortunately, the difficult social conditions in which the child is brought up do not pass without a trace [127].

The prevalence of mental retardation among the population ranges from one percent to three percent, while the incidence of this disorder among the male population is about 1.5 times higher than among the female [127].

According to ICD-10, there are mild mental retardation (F70), moderate (F71), severe (F72) and deep (F73), there are also sections F78 – other mental retardation and F79 – unspecified mental retardation. However, it should be borne in mind that this classification is statistical [85].

In practical use, the most common classification of S.S. Mukhin (2010), according to which four forms of mental retardation are distinguished: asthenic, atonic, stenic, dysphoric [88].

Mental retardation is characterized not only by underdevelopment of cognitive activity, but also by a violation of the emotional and volitional sphere of the child [82]. Primary manifestations of attention deficit can occur in three main age groups:

1. In early childhood.
2. In adolescence.
3. In adulthood.

Children with mental retardation later master speech, have difficulties in studying, generalizing and analyzing information, have problems with concentration, are restless, have poor basic self-care skills [100].

About 80% of children among the entire contingent of mentally retarded are children with a mild form of mental retardation. As a rule, such children are characterized by minimal cognitive disorders, minimal manifestations of motor deficiency. The behavior of such children is characterized by behavioral deviations – impulsivity, negativism, restlessness, they also have learning difficulties. However, most children with a mild degree of mental retardation, growing up, can live independently, are fit for work and are capable of self-care and personal hygiene procedures [87].

The diagnosis of “moderate mental retardation” is detected in approximately 11-12% of children with mental retardation. Despite the severity of the disease, such children are quite active in social relations with their peers, have communication skills, and are able to take care of themselves under the supervision of their parents. With early detection of the disease, proper treatment and social rehabilitation measures, such children, growing up, can work in certain areas of production [88].

About 8% are children with a “severe” form of mental retardation. Children belonging to this group are practically unable to take care of themselves, there are serious cognitive disorders, social disorientation, non-contact, often aggressive. In

addition, it is worth noting that this form of the disease is accompanied by serious motor disorders, epilepsy [92, 94].

In children with mental health disorders, dental anomalies are more common than in children without mental illnesses. The maxillary system is involved in vital functions of the body and especially of children [8, 36].

One of the key factors in the development of the maxillary system is the sucking function. P.K. Anokhin (1948) developed and proposed the concept of heterochronous maturation of systems, which claimed that a child is born with a formed sucking function [96]. Most children have a normal and hypokinetic type of sucking. With these types, the correct development of the bones of the facial and cerebral skull is observed, nasal breathing is normal. However, Y.L. Obratsov et al. (1991) identified 5 clinical violations of the act of sucking in children [1]:

- 1) complete violation;
- 2) sluggish sucking;
- 3) unsatisfactory sucking;
- 4) prolonged sucking;
- 5) perverted sucking.

Children with neuropsychiatric disorders often have deviations in the act of sucking by type 2 and 5 [14].

The development of the maxillofacial region also involves the acts of swallowing, chewing, breathing. But in children with existing neuropsychiatric disorders, concomitant disorders of the muscular apparatus are observed, which can cause difficulties when swallowing, chewing food.

The development and condition of the oral organs and the speech function are interrelated with each other. Research by T.B. Filicheva et al. (1989) allow us to identify some of the causes leading to speech disorders in children:

1. The development of speech function pathology in children can be promoted by various infections in the mother during pregnancy, toxicosis, pathology of the endocrine system in the mother, as well as incompatibility by blood group and/or Rh factor. The intrauterine period of fetal development from 4 weeks to 4 months is the time of

formation of the most severe deviations of speech function with a burdened history of the mother.

2. Intracranial hemorrhages, which are caused by fetal asphyxia or birth trauma.
3. Diseases of a child of various etiologies that occur in the first year of life.
4. Concussions of the brain that occurred after a skull injury.
5. Hereditary factors.
6. The growth and development of the child in unfavorable social and living conditions, which can lead to a decrease or violation of the emotional and volitional sphere of the child and lead to violations of speech function.

Dental anomalies are closely related to neuropsychiatric disorders and are more common in children with diseases of the nervous system [170].

Thus, the task of preventing dental diseases in children with neuropsychiatric disorders is relevant and important for practical healthcare.

1.6. The role of the family in the formation of dental health in children with neuropsychiatric disorders

The birth of a child with mental or physical health disorders is accompanied by emotional experiences of the family.

The foundations of a child's health are laid in the family. However, families with a child with neuropsychiatric or physical malformations often have difficulty in communication due to long-term worries about the child's illness. Many parents with children with neuropsychiatric disorders need help in adaptation from both medical professionals and social services.

L.G. Zaborina (2017), who studied the state of mental stress and emotional experiences of parents raising children with disabilities, came to the conclusion that parents raising children with disabilities are exposed to constant stress, depression and negative attitude towards others. The author notes that parents of disabled children have

a long negative experience, including a state of chronic psychological stress, feelings of anxiety and disturbance [41].

Researcher S.A. Khazova (2020), who studies the psychological state of families raising children with CP, came to similar conclusions [92].

At the same time, some authors who conduct research on families raising disabled children have come to the conclusion that as a result of struggling with difficult life circumstances, many families can strengthen (Joseph, Linley, 2008).

Maintaining a favorable family environment is the key to a child's health. However, unfortunately, according to statistics, in 2019 in Russia 51% of marriages end in divorce (in the USA – 53%, and the highest percentage in the Maldives – 73%), there are 4.7 divorces per 1000 inhabitants in Russia, and this is the highest rate in the world [92].

The divorce of parents is a serious test for a child, being a traumatic factor that can aggravate the psycho-emotional state of a child with disabilities. The parental environment as an essential factor in the formation of the internal picture of the child's health, which determines his health in the future, is considered by I.M. Shishkova (2016). According to R.A. Berezovskaya (2011), the attitude to one's health and the formation of healthy habits in adulthood are laid down from childhood. Dysfunctional relationships of children with their parents are risk factors that form children's behavior associated with risk and negative health consequences [15].

Children are the reflection of parents, it is the family that forms the child's attitude to themselves and their health, helps to develop skills to observe personal hygiene, including oral care. Dental health and oral hygiene largely depend on the education of parents on the prevention of dental diseases [15].

In their study, T.Y. Pomytkina et al. (2020) examined the condition of the oral cavity in 93 adolescents aged 14-16 years, and also conducted a survey of parents and children on the level of dental literacy. According to the results of the study, it turned out that the prevalence of oral diseases, such as dental caries and inflammation of periodontal tissues, directly depends on the literacy of parents and children in matters of oral care. Only 10.12% of all surveyed children from the group of parents with a low

level of dental literacy were able to demonstrate the correct method of brushing teeth according to the method of G.N. Pakhomov, and in the groups of parents with a high and average level of dental education is 24.05% and 17.72%, respectively. At the same time, many parents noted that dentists during dental examination do not teach the rules of oral hygiene, methods of brushing teeth [82].

However, as noted S.Y. by Kosyuga et al. (2018), an increase in the carious process in schoolchildren aged 14 was not observed during dental education for three months. In addition, the authors recorded a significant improvement in oral hygiene indicators in schoolchildren aged 14, which undoubtedly confirms the importance of periodic dental education for children and adolescents [55].

Other Russian authors who conducted a sociological survey of 2,289 parents came to similar conclusions. Almost a third of parents of children with malformations were in unfavorable conditions, and the level of knowledge about the prevention of dental diseases was low. The study data showed that 21.4 ± 1.3 out of 100 mothers surveyed were not engaged in their health care. The lack of formed healthy lifestyle skills, compliance with regular oral care for parents increases the risk of oral diseases in children. However, the authors also noticed the fact of a low level of educational activity of medical personnel [108].

Recently, more and more attention has been paid to the issues of educational activities and comprehensive support for a family raising a child with special needs.

For example, in Primorsky Krai, as part of the pilot project, a set of measures was developed to support children with disabilities, including those living in families (Order of the Department of Labor and Social Development in Primorsky Krai No. 296 of 06.06.2019) [76].

The support program is aimed at:

- 1) providing psychological and correctional-pedagogical support to families in matters of education and development of children;
- 2) development of parents' skills in the maintenance and upbringing of the child, including the protection of their rights and health;

- 3) improving the legal competence of parents on issues of state guarantees to families raising disabled children and familiarization with the basics of legislation in the field of protection of children's rights.

The purpose of the program is not only to help social workers, medical personnel in the care and treatment of a child with disabilities, but also to teach parents the skills and rules of care, including oral care. Volunteers of various charitable organizations, whose members are doctors, psychologists, and social service workers, work with children living in orphanages.

The Foundation for the Support of Children in Difficult Life Situations, together with the executive authorities, launched a pilot project in 2015 as a part of the implementation of the program "National Strategy of Actions in the Interests of Children for 2012-2017", the purpose of which was to provide comprehensive medical, social, psychological and pedagogical assistance. In such regions as the Novosibirskaya and Voronezhskaya regions, as well as in the Krasnodarsky Krai, centers were created to implement the goals and objectives of the project, which provided specialized assistance during consultations and diagnostics of ASD diseases in children. The centers also held training seminars and lectures for doctors and medical professionals. Specialists have also developed plans to provide comprehensive care for children with ASD and interdepartmental cooperation to improve the quality of the care provided. Following the results of the pilot project in the participating regions, the Moscow State Psychological and Pedagogical University prepared a number of methodological guidelines for comprehensive assistance to children with ASD and developed standard regulatory documents. In addition to the development of regulatory and legal documentation, the results of the project were proof of the effectiveness of a set of measures based on behavior analysis to provide correctional assistance to children with ASD. Such methods include ABA therapy, as well as cognitive behavioral therapy aimed at correcting social behavior. The effectiveness of these methods, as one of the leading methods used in the treatment of children with ASD, is described in both foreign and domestic works [54].

Since 2013, the correctional center “Parusa nadezhdy” has been operating in Primorsky Krai, which provides support to families raising children with mental health disorders.

In order to implement comprehensive psychological, pedagogical, correctional support for families with children suffering from autism spectrum disorders, the “Azimut” correctional center was opened in 2017 in Astrakhan. The specialists of the center actively cooperate with government officials, doctors to help both children and parents [101].

Assistance to children with autism in Russia, being at the initial stage of development, depends on many factors, including:

- availability of specialized programs in the subjects of the Russian Federation,
- interaction between agencies providing medical, social, psychological, pedagogical and other assistance to children with autism and their families.

Often, after the final diagnosis is established, parents of children with autism prefer to be treated by a neurologist or, without consulting psychiatrists, engage with speech therapists and psychologists. The inability to accept the situation and diagnosis of the child results in the fact that parents often ignore visits and treatment in specialized clinics according to the profile, which significantly complicates work with autistic children.

The untimeliness of providing assistance to children with ASD in Russia can be explained by several reasons, first of all, it is insufficient universal screening measures. In addition, there is a lack of accessible and up-to-date information among medical professionals both on methods of detecting autism spectrum diseases in children and on methods of rehabilitation and treatment of children with ASD.

However, despite the measures of social support of families by the state, the issues of the formation of dental health in children with neuropsychiatric disorders remain unresolved. There is also practically no sanitary and educational work on the development of skills and rules of oral hygiene for both parents and children.

1.7. Providing dental care to children with neuropsychiatric disorders

According to the current legislation (RF Law No. 3185-I of July 2, 1992 “On psychiatric care and guarantees of citizens’ rights in its provision” (ed. from December 08, 2020) assistance to children with neuropsychiatric disorders is provided in a psychiatric hospital with the consent of their parents and/or legal representative.

However, on the basis of Federal Law No. 323-FZ of 21.11.2011 “On the basics of protecting the health of citizens in the Russian Federation”, children have the right to seek dental care in a dental clinic.

The treatment of neuropsychiatric disorders is accompanied by the use of neuroleptics and other psychotropic medications, which can affect not only the behavior of the patient in the dentist’s chair, but also lead to an increase in the effect of local anesthetic medications. In the conditions of a neuropsychiatric hospital, it is possible to predict the interaction of medications, besides, the dentist always has the opportunity to consult with the attending psychiatrist and adjust the treatment plan. At an outpatient appointment in a dental clinic, patients may not notify the dentist about the presence of neuropsychiatric disorders and taking medications.

Therefore, one of the main problems is the unwillingness of a dentist to provide assistance to children with neuropsychiatric disorders in a dental clinic. Treatment of patients with neuropsychiatric diseases should be carried out with the use of general anesthesia in a hospital or under sedation with the preservation of consciousness in order to avoid negative consequences of treatment for both the patient and the dentist. However, the use of such types of anesthesia is justified in the presence of multiple dental caries, emergency conditions. Programs aimed at prevention can prevent the spread of dental caries and other oral diseases in children with neuropsychiatric disorders.

For the early diagnosis of neuropsychiatric disorders, according to the Order of the Ministry of Health of the Russian Federation dated December 21, 2012 No. 1346n “On the procedure for minors to undergo medical examinations, including upon admission to educational institutions and during the period of study in them”, a medical examination is carried out “... for children under 1 year - monthly, from 1 to 2 years – once every 3 months, from 2 to 3 years – once every six months, then once a year...”. Based on the Order of the Ministry of Health of the Russian Federation dated August 10, 2017 N 514n “On the procedure for preventive medical examinations of minors” (ed. From November 19, 2020) examination by a psychiatrist is carried out for the first time in two years. These measures make it possible to identify a neuropsychiatric disorder at an early age and begin medical and social rehabilitation work with children.

The Government of the Russian Federation has adopted the state program “Development of Healthcare 2018-2025” (Decree of the Government of the Russian Federation No. 1640 of December 26, 2017), which prescribes the development of primary prevention of dental diseases.

Unfortunately, at present there is practically no data on large-scale programs of dental examination and prevention of dental diseases among children with neuropsychiatric disorders.

Several problems remain unsolved:

- 1) lack of training of dentists for the treatment of children with neuropsychiatric disorders in outpatient settings;
- 2) lack of large-scale preventive programs to prevent dental diseases for children with neuropsychiatric disorders.

Therefore, the task of developing a set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders and to assess the effectiveness of its use seems urgent.

CHAPTER 2. MATERIALS AND METHODS OF RESEARCH.

2.1. Research materials

To study the prevalence and intensity of dental diseases among children of Primorsky Krai, a dental examination of 432 children without mental health disorders aged 8-12 years, including 226 girls and 206 boys, was conducted (Table 1).

Table 1 - Characteristics of the examined patients by age and gender.

Gender	Age 8–10 years	Age 11–12 years	Total
boys	97	109	206
girls	118	108	226
Total	215	217	432

In order to implement the objectives of the study, 185 children aged 8-12 were examined and dynamically monitored, including 123 children registered at dispensaries in psychoneurological dispensaries of Primorsky Krai, and 62 mentally healthy children.

The surveyed were divided into 5 groups (Table 2):

- Group 1 (study 1) – 17 children suffering from schizophrenia, F 20.0 schizophrenia (ICD-10);
- Group 2 (study 2) – 98 children suffering from mental retardation, F 70 – mild mental retardation (ICD-10);
- Group 3 (study 3) – 8 children with autism, F 84.0 children's autism (ICD - 10);
- Group 4 (control 1) – 30 children without neuropsychiatric disorders;
- Group 5 (control 2) – 32 children who also do not have neuropsychiatric disorders.

Table 2 - Characteristics of the examined groups of patients by age and gender.

Age, years	Groups of patients											
	1 st		2 nd		3 rd		4 th		5 th		Total	
	m	f	m	f	m	f	m	f	m	f	m	f
8–10	3	5	27	22	4	1	7	8	8	8	49	44
11–12	5	4	19	30	3	0	7	8	8	8	42	50
Total	8	9	46	52	7	1	14	16	16	16	91	94

The examination was conducted on the basis of the KGAUZ “Artemovskaya SP, KGBUZ “Regional children’s dental polyclinic”, where annual medical examination of children is carried out.

Criteria for inclusion in the study groups:

1. Children aged 8-12 years suffering from schizophrenia.
2. Children aged 8-12 years suffering from autism.
3. Children aged 8-12 years suffering from mental retardation.
4. Informed consent of parents and /or official guardians (representatives) for the child’s participation in the examination and carrying out medical and preventive measures.

Exclusion criteria:

1. Children under the age of 8 and over the age of 12.
2. The presence of diagnosed concomitant diseases of other organs and systems in the child.
3. The presence of neuropsychiatric disorders, except autism, schizophrenia and mental retardation.
4. Adult patients.
5. Lack of informed consent of parents and / or official guardians (representatives) for the child’s participation in the examination and carrying out medical and preventive measures.

Criteria for inclusion in the control group:

1. Children aged 8-12 years.
2. Informed consent of parents and/or official guardians (representatives) for the child's participation in the examination and carrying out medical and preventive measures.
3. Absence of diagnosed diseases of internal organs and systems in children.
4. Absence of diagnosed neuropsychiatric disorders in children.

Exclusion criteria:

1. Children under 8 years old and over 12 years old.
2. Adult patients.
3. Lack of informed consent of parents and/or official guardians (representatives) for the child's participation in the examination and carrying out medical and preventive measures.
4. The presence of diagnosed diseases of internal organs and systems.
5. The presence of diagnosed neuropsychiatric disorders.

According to the current legislation of the Russian Federation (Federal Law No. 323-FZ of 21.11.2011 (as amended on 03.08.2018) "On the basics of protecting the health of citizens of the Russian Federation"), before the start of diagnostic and/or therapeutic and preventive measures, consent was obtained from parents, guardians, legal representatives accompanying children to conduct an examination, necessary manipulations. The methods used in the scientific work correspond to and do not contradict Article 40 of the "Fundamentals of the Legislation of the Russian Federation on the protection of citizens' health" dated July 22, 1993 No. 5487-1, OrderNo. 228 of the Ministry of Health of the Russian Federation of 1993 "On approval of the regulations on a clinical treatment and prevention institution" and the "Code of Ethics of the Russian doctor". During the study, diagnostic and treatment methods associated with increased risk to the patient were not used.

The presence of a neuropsychiatric disorder was established by a child psychiatrist. Groups of patients were randomized according to the underlying disease, comparable according to the treatment prescribed by a psychiatrist.

When selecting patients, the recommendations of a psychiatrist regarding the prospects of establishing contact between a pediatric dentist and a child were taken into account. General treatment was prescribed by a pediatrician.

The children of the 5th (control) group received treatment according to the application, we did not carry out a special program of therapeutic and preventive measures.

The developed set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders was used in patients of the first four groups, i.e. in children with neuropsychiatric disorders and mentally healthy children of the 4th (control) group.

Children of the 5th (control) group, also not suffering from neuropsychiatric disorders, performed oral hygiene using basic hygiene products, choosing toothpaste at the discretion of parents, and did not receive preventive measures.

The medications used in the study had the necessary registration certificates of the Russian Federation and certificates of conformity.

To assess the effectiveness of the developed set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders, dental examination of patients was carried out within 6, 12, 18 months. All preventive measures were carried out at the same time.

2.2. Research methods

2.2.1. Methods of dental examination

Dental examination of children was carried out using a dental mirror, dental probe, tweezers under artificial lighting.

The subjective part of the examination consisted of collecting complaints and anamnesis data. Special attention was paid to the collection of anamnestic data: the

hereditary burden, the use of pharmacological medications used to treat the underlying neuropsychiatric disorder were investigated.

During external examination, the color of the skin was assessed, the presence/absence of pathological changes on the red border of the lips, the presence and/or absence of facial asymmetry, the proportionality of its departments, the severity of nasolabial and chin folds were recorded, the condition of the temporomandibular joint, regional lymph nodes were assessed.

During the examination of the oral cavity, the condition of periodontal tissues, oral hygiene were assessed, the presence of caries-affected and missing teeth was recorded, the presence of trims and diastemas, the incorrect position of teeth in the dentition was recorded, the condition and attachment of the bridles of the lips and tongue were assessed.

The data were entered into the dental patient's card form 043/u (order of the Ministry of Health of the USSR dated 04.10.1980 No. 1030, ed. dated 31.12.2002 "On approval of forms of primary medical documentation of institutions").

During the examination, the following indicators characterizing the condition of the oral cavity were determined: the prevalence of dental caries is an indicator that represents the proportion (%) of children with dental caries to the total number of the examined. For temporary and permanent teeth, we separately studied the prevalence.

According to the WHO evaluation criteria for 12-year-olds, the prevalence of dental caries of 0-30% is considered low, 31-80% is average, 81-100% is high [81].

The intensity of dental caries is an indicator that displays the degree of dental caries damage. To determine this indicator, the average value of the indices of the DMF of teeth (DMF), DMF+the number of carious and filled teeth of temporary bite is used. In a permanent bite, the index of the DMF of teeth (DMFt) is calculated, where D is the teeth of a permanent bite having carious cavities, F is the teeth of a permanent bite having fillings, M is the removed permanent teeth. In this case, the criterion "D" includes: permanent teeth with a carious cavity, teeth with a temporary filling, permanent filling and caries, sealant and caries. Criterion "F" does not take into account teeth covered with crowns. The criterion "M" takes into account teeth

removed due to complicated caries, do not include teeth removed for orthodontic indications, in connection with a change of teeth, etc.

According to WHO recommendations, the intensity of dental caries was assessed depending on the index:

- very low (0-1.1 points);
- low (1.2–2.6 points);
- average (2.7–4.4 points);
- high (4.5–6.5 points);
- very high (6.6 points and above) [81].

The average increase in the intensity of dental caries was determined as the difference between the average DMF 18 months after the initial examination and the primary indicator, expressed in points.

To determine the average percentage of reduction of dental caries growth in the group of examined from 100%, the quotient of dividing the average increase in the DMFt indicator in the compared group by the average increase in the DMFt indicator in the control group multiplied by 100% was subtracted.

An index assessment of the state of periodontal tissues was carried out using the complex periodontal index CPI (P.A. Leus, 1988), which is used for individual determination of periodontal status, as well as for mass examinations taking into account age groups by age. 17/16, 11, 26/27, 31, 36/37, 46/47 teeth were investigated. If the tooth that needs to be examined is removed or is missing for some reason, we examine the neighboring one in compliance with the only condition: the tooth must be from the same group. The maximum severity score of the periodontal condition was set when all teeth of the same group were missing. When determining the CPI, the criteria specified in table 3 were used.

In the presence of several signs, a higher score was recorded, characterizing a more severe lesion of periodontal tissues. In case of doubt, preference was given to hypodiagnosics.

The complex periodontal index for each subject was considered by formula (1):

$$CPI = \frac{\text{The sum of the codes of six teeth}}{6} \quad (1)$$

The average value of the CPI in the group of examined patients was determined by the average number of individual values of the complex periodontal index.

CPI has reproducibility from 80 to 93%. The index is effective in assessing the initial manifestations of pathology and determining the severity of the process, since it takes into account all possible signs of the disease from risk (plaque on the teeth) to the developed pathology, accompanied by the appearance of tooth mobility. The CPI index has become widespread due to its use in clinical and epidemiological studies of all age groups. There is also no need for specialized equipment or tools. The index is effective in the diagnosis of periodontal tissue diseases at the initial stages, since it takes into account the presence of plaque.

Table 3 - Criteria for determining the CPI

Codes	Features	Criteria
0	Healthy	Plaque and signs of periodontal lesions are not determined during the examination
1	Plaque	Any amount of soft white plaque determined by the probe on the surface of the crown, in the interdental spaces or the posterior region
2	Bleeding visible to the naked eye	Bleeding with light probing of the dentoalveolar groove (periodontal pocket)

Continuous of table 3.

3	Dental calculus	Any amount of solid deposits (dental calculus)
4	Periodontal pocket	Periodontal pocket, determined by the probe
5	Tooth mobility	Pathological mobility of the tooth of the 2 nd -3 rd degree

To determine the intensity of periodontal diseases, the evaluation criteria of the CPI index were used (Table 4):

Table 4 - Evaluation criteria of the CPI

CPI	Intensity level
0,1–1,0	Risk of disease
1,1–2,0	Light
2,1–3,5	Average
3,6–5,0	Heavy

Taking into account the complexity of dental manipulations for children with neuropsychiatric disorders, the level of oral hygiene was assessed using the Yu.A. Fedorov-V.V. Volodkina hygiene index (1964) as the simplest and least prolonged in use. According to the test procedure, a solution, including potassium iodide – 2.0; crystalline iodine – 1.0; distilled water – 40.0 was used. Six frontal teeth of the lower jaw were stained from the labial side.

The quantitative assessment was carried out according to a five-point system:

- the entire surface of the tooth was stained – 5 points;
- 75 % of the tooth surface was stained – 4 points;
- 50 % of the tooth surface was stained – 3 points;
- 25 % of the tooth surface was stained – 2 points;
- tooth surface is not stained – 1 point.

The calculation was made according to the formula (2):

$$HI = \frac{\sum \text{the hygienic cleaning index of one tooth (the sum of the grades for each tooth)}}{n}, \quad (2)$$

where HI is the general hygienic cleaning index, n is the number of teeth examined (6).

Dividing the sum of points by their number, an indicator of oral hygiene (hygiene index) was obtained. When determining the quality of oral hygiene, the studied indicator was evaluated as follows:

- 1.1–1.5 points – good hygiene index;
- 1.6–2.0 points – satisfactory;
- 2.1–2.5 points – unsatisfactory;
- 2.6–3.4 points – bad;
- 3.5–5.0 points – very poor hygiene index.

With regular and proper oral care, the hygiene index varies between 1.1–1.6 points, in the absence of adequate oral care, the hygiene index increases to 2.6 or more points.

As an additional research method, we used X-ray examination, i.e. targeted dental images, orthopantomography (Figure 1).



Figure 1. Patient A., 12 years old. X-ray of the tooth 5.5.
Chronic periodontitis of the tooth 5.5.

2.2.2. Laboratory research methods

One of the early methods of diagnosing the risk of dental caries is to determine the pH of saliva. The study was carried out using an electronic pH meter “pH-340” (Measuring instruments Factory, Belarus, Gomel) (Figure 2). Oral fluid was collected on an empty stomach in the morning in an amount of 2.0 ml, the measurement was carried out three times and the average was determined. Normally, the pH of the oral cavity is 6.8–7.7, and the lower this indicator, the higher the risk of dental caries.



Figure 2. Saliva pH measuring device.

2.2.3. Statistical methods of processing research results

Statistical data processing was carried out on a personal computer using the software STATISTICA 10 for Windows 10.0 and Microsoft Excel 2010. Statistical criteria of nonparametric statistics were applied. The arithmetic mean (M), the

representativeness error (m) were calculated, and the correlation between dental health indicators (r) was calculated.

The Student's criterion was used as a criterion for the significance of differences between a series of observations, which is the ratio of the deviation of the arithmetic mean (M) of a given sample consisting of the number (n) of observations to the true value of the parameter of the whole population to the standard deviation.

To compare the indicators in groups with different numbers of children, the Mann-Whitney test was used to compare the indicators in two independent samples. The test verifies the null hypothesis H_0 about the absence of differences in the central values of the samples against the alternative hypothesis H_1 about the similarity of the indicators in the two groups. To reject or confirm the null hypothesis, Z statistics were calculated, compared with the standard values of the normal distribution: as a result, the level was determined, compared with the α – the level of significance of the rejection of the null hypothesis. It was believed that if $p > \alpha$, then H_0 is true that there are no differences in the indicators of the examined groups of children, if $p \leq \alpha$, then H_1 is true that there are differences. 0.05 was chosen as the significance level of α [28].

2.2.4. Methods of clinical and psychological research

At the beginning of the study, the child was examined without carrying out the activities of the training unit of the set (M_0), further evaluation of the results of the use of training activities was carried out 2, 3, 4 and 6 months after the initial examination (M_2 , M_3 , M_4 , M_6) according to the following indicators:

- the child's consent to be in the dentist's chair in the office;
- opening the mouth;
- the child's consent to use a mirror to examine the oral cavity;
- the child's consent to conduct hygienic and preventive measures;
- the child's consent to the treatment of dental caries, to the removal of teeth.

To assess the behavior of children, a developed Scale for assessing the behavioral reactions of the child was used.

2.3. Methods of dental prevention and treatment of dental diseases in children suffering from certain neuropsychiatric disorders

The developed set of educational and therapeutic and preventive measures was used to prevent the development of oral diseases in children with certain mental health disorders, which includes measures to prepare children for visiting the dentist and practicing hygiene skills, oral care, prevention of dental diseases.

CHAPTER 3. EXAMINATION OF THE ORAL CAVITY IN CHILDREN WITH CERTAIN NEUROPSYCHIATRIC DISORDERS

3.1. Dental status of mentally healthy children in Primorsky Krai

To study the prevalence and intensity of dental diseases among children of Primorsky Krai, a dental examination of 432 children aged 8-12 years, including 226 girls and 206 boys without mental illness, was conducted.

It was found that the prevalence of caries of temporary teeth was $51.6 \pm 2.4\%$, the prevalence of caries of permanent teeth was $31.0 \pm 2.2\%$. The total index of DMF + the number of carious and filled teeth of temporary bite was 2.87 ± 0.26 points.

The indicator of the hygiene index of Yu.F. Fedorov-V.V. Volodkina (1968) was 1.81 ± 0.41 points, the index of the CPI index (P.A. Leus, 1988) was 1.27 ± 0.28 points. There were no cases of prepubescent and juvenile periodontitis. Localized periodontitis against the background of local predisposing factors (a combination of malocclusion, a low level of oral hygiene) was detected in one patient (0.2%), while the depth of periodontal pockets up to 3.5 mm was recorded. The prevalence of chronic catarrhal gingivitis is $54.6 \pm 2.4\%$.

3.2. Dental status of children with some neuropsychiatric disorders in Primorsky Krai

To identify the development of the carious process, to register cases of inflammation of periodontal tissues, we studied the condition of the oral cavity of 185 children living in Primorye.

Analyzing the data of the hygiene index of Yu.A. Fedorov-V.V. Volodkina (1968), we came to the conclusions:

In group 1 patients suffering from schizophrenia, $88.2\pm 8.1\%$ (15 children) had a very poor level of hygiene, $11.8\pm 8.1\%$ (2 children) had a poor level of oral hygiene.

Out of 98 patients of the 2nd group suffering from mental retardation, in 55 cases ($56.1\pm 5.0\%$), a poor level of oral hygiene was established, in 37 ($37.8\pm 4.9\%$) - a very poor level of hygiene, in six cases ($6.1\pm 2.4\%$) – an unsatisfactory level of oral hygiene.

In the 3rd group of patients suffering from childhood autism, seven out of eight patients ($87.5\pm 12.5\%$) had a very poor level of oral hygiene and 1 ($12.5\pm 12.5\%$) had a poor level of hygiene.

In total, out of 123 children with neuropsychiatric disorders, 6 patients ($4.9\pm 2.0\%$) had an unsatisfactory level of oral hygiene, 58 people ($47.2\pm 4.5\%$) had a poor level of hygiene, and 59 ($48.0\pm 4.5\%$) of the examined children had a very poor level of hygiene.

Out of 30 patients of the 4th (control) group of mentally healthy children, 24 ($80.0\pm 7.4\%$) had a satisfactory level of oral hygiene, 4 ($13.3\pm 6.3\%$) had a poor level of hygiene, 2 ($6.7\pm 4.6\%$) had a good level of oral hygiene.

In the fifth (control) group of children without mental illnesses, 27 children ($84.4\pm 6.5\%$) had a satisfactory level of oral hygiene, 3 ($9.4\pm 5.2\%$) had a poor level of hygiene, 2 ($6.3\pm 4.4\%$) had a good level of oral hygiene.

In total, among 62 mentally healthy children, a satisfactory level of oral hygiene was established in 51 children ($82.3\pm 4.9\%$), a poor level of hygiene – in 7 children ($11.3\pm 4.1\%$), a good level of oral hygiene – in 4 children ($6.5\pm 3.2\%$).

Thus, in children with neuropsychiatric disorders, the level of oral hygiene during the initial examination significantly differed for the worse from children without mental illness ($p < 0.001$).

The results of the study of the level of oral hygiene are shown in the figure 3.

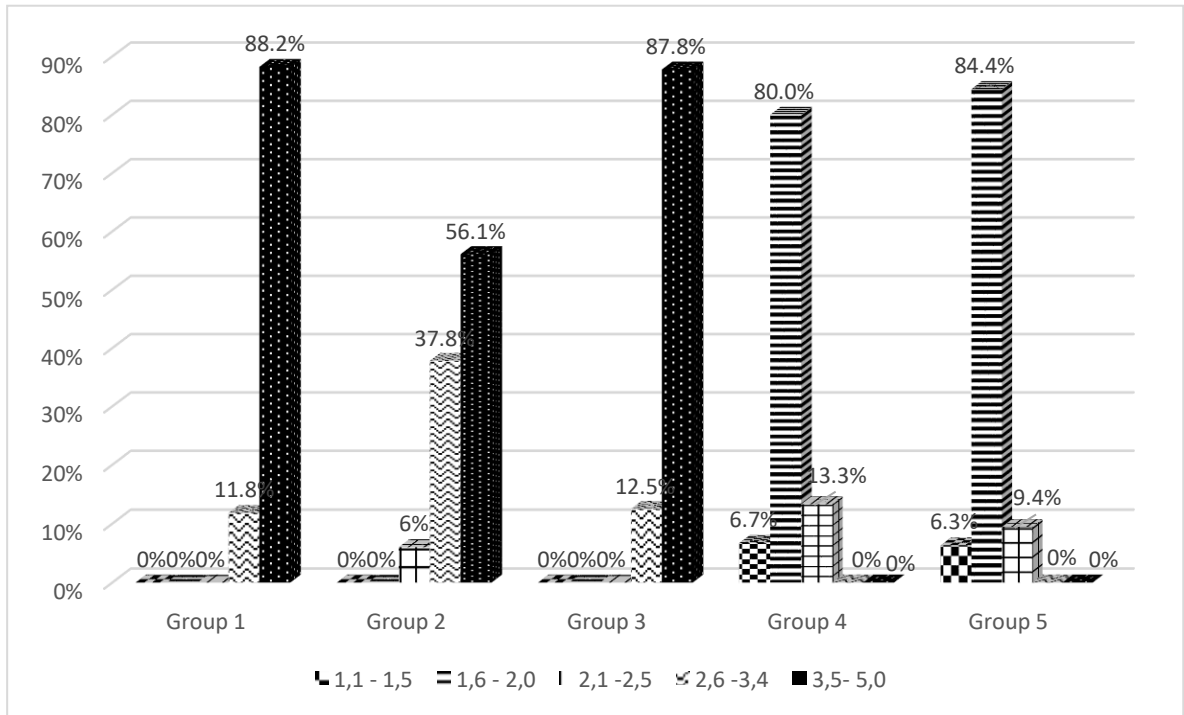


Figure 3. Frequency of occurrence of oral hygiene levels according to the Yu.A. Fedorov-V.V. Volodkina index (1968) in 1-5 groups of patients.

The conducted dental examination revealed a higher prevalence of dental caries in children with neuropsychiatric disorders than in children without mental disorders (Figure 4).

Among 17 patients of the 1st group suffering from schizophrenia, the prevalence of caries of temporary teeth was 100%, permanent teeth – $88.2 \pm 8.1\%$ (15 people).

In group 2 patients suffering from mental retardation, the prevalence of caries of temporary teeth was 100% (98 children), and permanent teeth – $69.4 \pm 4.7\%$ (68 children).

Out of 8 patients of the 3rd group suffering from autism, caries damage of temporary teeth was detected in all children (100%), permanent teeth – in 7 children ($87.5 \pm 12.5\%$).

Out of 123 examined children with neuropsychiatric disorders, caries of temporary teeth was detected in 123 patients (100%), caries of permanent teeth - in 90 children (73.2±4.0%).

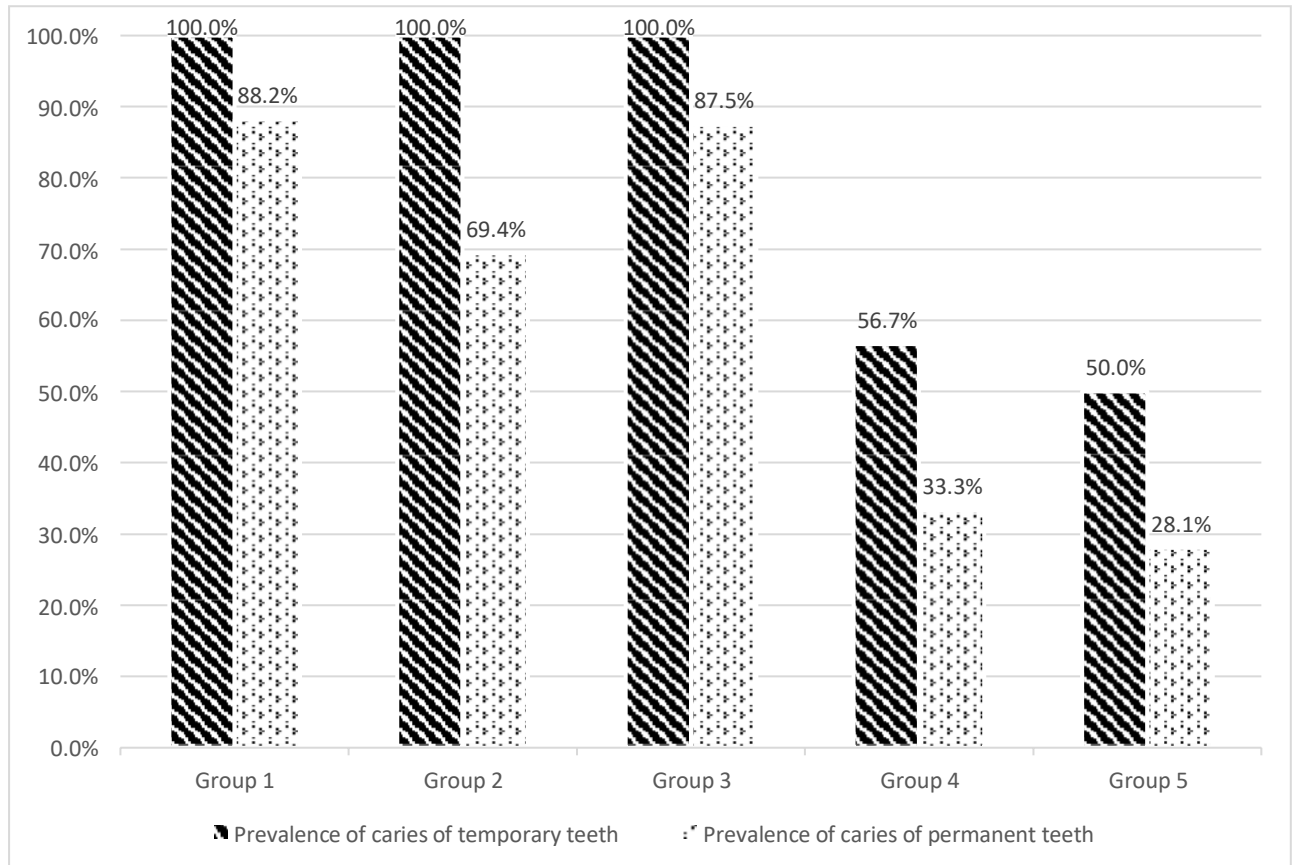


Figure 4. Prevalence of dental caries in 1-5 groups of patients, %.

In group 4 (children without neuropsychiatric disorders), caries damage to temporary teeth was found in 17 cases (56.7±9.2%), permanent teeth – in 10 cases (33.3±8.8%) out of 30 examined children.

Out of 32 patients of the 5th group (children without neuropsychiatric disorders), caries of temporary teeth was detected in 16 people (50.0±9.0%), permanent teeth – in 9 children (28.1±8.1%).

In total, out of 62 examined children without identified neuropsychiatric disorders of the 4th and 5th groups, caries of temporary teeth was detected in 33 (53.2±6.4%), permanent teeth - in 19 (30.7±5.9%).

Thus, the prevalence of caries of both temporary and permanent teeth in children with neuropsychiatric disorders is significantly higher than in the control groups ($p<0.001$).

Similar data on the prevalence of dental caries in children with neuropsychiatric diseases are given in the studies of I.M. Losik, T.N. Terekhova (2011) [62].

When assessing the intensity of the carious process according to the indices of DMF+the number of carious and filled teeth of temporary bite, a more significant predominance of the “D” component was revealed in 1-3 (main) study groups (84.1±3.3%) compared with 4-5 (control) groups (61.4±6.2%, $p<0.01$). Most likely, this is due to the fact that children with neuropsychiatric disorders are much less likely to go to the dentist for the purpose of planned oral sanitation. Such patients are more often provided with dental care for the treatment of “acute pain”.

Indicators of the intensity of dental caries in patients of groups 1-3 differ significantly from the indicators of patients of groups 4-5 ($p<0.05$) (Table 5). For example, in children suffering from schizophrenia (group 1), the indicator is 5.06±0.42 points, which is significantly different from the indicator of mentally healthy children (groups 4 and 5) – 2.93±0.46 and 2.89±0.37 points, respectively, $p<0.05$.

It should be borne in mind that it is not always possible for children with mental illnesses to cure all teeth affected by caries due to the peculiarities of their behavior. It is often necessary to remove teeth in a hospital and /or outpatient clinic, as evidenced by a higher “M” component in the index structure in children with neuropsychiatric disorders (7.2±2.3%) compared with children without them (1.2±1.4%, $p<0.05$).

The most common diseases, after dental caries, were inflammatory diseases of periodontal tissues (Figure 5).



Figure 5. Patient K., 12 years old, 2nd group. Chronic catarrhal gingivitis.

Localized periodontitis on the background of malocclusion (deep bite) and a very poor level of oral hygiene was recorded in one patient (0.8%) of group 2, while the depth of periodontal pockets did not exceed 3.4 mm.

Table 5 - Indicators of the intensity of dental caries in children of 1-5 groups, points (M±m)

Indicator Group	Indicators of the intensity of dental caries
	DMFt, DMF+the number of carious and filled teeth of temporary bite
Group 1	5,06±0,42
Group 2	4,43±0,44
Group 3	4,75±0,52
Group 4	2,93±0,46
Group 5	2,89±0,37

The index of the CPI index (P.A. Leus, 1988) in the 1-3 study groups significantly exceeded the indicators in the control groups and amounted to 2.42 ± 0.24 , 2.24 ± 0.19 and 2.39 ± 0.21 points, respectively (on average 2.35 ± 0.21), while no significant differences were found between groups 1-3 ($p > 0.05$).

Probably, the high indicators of the CPI index in children of groups 1-3 of the study are due to the combination of exposure to risk factors: taking medications, poor oral hygiene, periodic inpatient treatment. It is also necessary to take into account the direct effect on the rate of salivation of the child's mental state (nervous excitement, depression, etc.), described by E.M. Kuzmina et al. (2016) [81].

After analyzing the data of children with certain mental health disorders and children without concomitant mental illness participating in dental examination, it can be concluded that the prevalence of diseases of the oral cavity and periodontal tissues is more susceptible to children with mental illnesses.

Thus, the need was identified to create a set of educational and therapeutic and preventive measures that can be used in children with certain neuropsychiatric diseases for the prevention of dental diseases.

3.3. The developed set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with certain disorders of neuropsychiatric health and the methodology of its application

Taking into account the results obtained during the examination and the recommendations of the pediatric, psychiatric services of the Primorsky Krai, a set of educational and therapeutic and preventive measures has been developed to prevent the development of oral diseases in children with certain mental health disorders, which consists of several modules.

The first module of events. Teaching oral hygiene to a child.

The objectives of the first module of events:

- teaching the child oral hygiene skills;
- development of "habituation" to the dental environment;
- reduction of the severity of stomatophobia in children.

A special training program, developed taking into account the peculiarities of information perception by children with certain neuropsychiatric diseases, includes a demonstration of a slide film with all stages of oral care (Figures 6-11) and filmed specifically for children with mental illnesses. Standard dental cleaning techniques are demonstrated to children in a playful way, using a visual aid, and recommendations for oral care are given.

Also, to practice the skills of brushing teeth, a coloring book, which was handed out to parents was developed, (Appendix 3).

After the lessons and to consolidate the information received, children are invited to demonstrate oral hygiene and care skills on toys and dolls, and after 2-3 classes, children are invited to conduct oral hygiene on their own.



Figure 6. A fragment of a training slide film on oral care, training in brushing teeth of the upper jaw on the right.



Figure 7. A fragment of a training slide film on oral care, training in brushing teeth of the upper jaw on the left.



Figure 8. A fragment of a training slide film on oral care, training in brushing the teeth of the lower jaw on the right.



Figure 9. A fragment of a training slide film on oral care, training in brushing the teeth of the lower jaw on the left.



Figure 10. A fragment of a training slide film on oral care, training in brushing the teeth of the vestibular surface on the right.



Figure 11. A fragment of a training slide film on oral care, training in brushing the teeth of the vestibular surface on the left.

Also, the first module of events of the set provides for multiple demonstrations of photos of a 5-year-old child visiting a dentist to children (Figures 12-14). Photos are shown to children 2-3 times a week to reduce the feeling of fear before visiting a dentist.

During the events of the first module of the set, parents should start daily brushing the child's teeth, if the child protests, they should not force him, but continue to demonstrate photos and conduct classes with him in a playful way. When a child agrees to brushing his teeth by his parents, after 7-10 days of successful brushing with parental comments on their actions, the child's parents should study with him and color the developed coloring book (Appendix 3), demonstrating the need for brushing teeth and visiting a dentist.



Figure 12. A child in a dental chair.



Figure 13. A pediatric dentist conducts an examination of the child's oral cavity.



Figure 14. A pediatric dentist performs an examination of the oral cavity using a dental mirror.

The second module. Oral hygiene training lessons for parents.

The events of the second module of the set are held in parallel with the events of the first module.

The objectives of the second module activities:

- motivation of parents to observe oral hygiene in a child;
- teaching standard methods of brushing teeth to parents;
- informing parents about additional methods of prevention of oral diseases.

Before the training lessons, a survey of the child's parents is conducted in order to collect anamnesis. When collecting anamnesis, the hereditary burden of the anamnesis, the course of the mother's pregnancy, the bad habits of the parents are taken into account, the nature of the therapy of the underlying disease, medications, dosage, frequency of administration used to treat the underlying disease are specified. Attention is drawn to the nature of the child's nutrition. The doctor fills in the medical documentation.

The information module includes a developed lecture course “Temporary and permanent bite: only facts” (Appendix 2). One of the directions of this module is to

familiarize parents raising children with certain neuropsychiatric diseases with ways to prevent the appearance of caries and methods of oral care.

The third module. Acquaintance with the dentist.

The objectives of the third module of events:

- adaptation of the child to the situation in the dental office;
- familiarization of the child with the basic tools used in the examination of the oral cavity and the conduct of professional oral hygiene;
- assessment of the psychoemotional state of the child by the doctor;
- assessment of the child's oral care skills by the doctor.

To do this, the child's psychoemotional state is assessed in a playful way using the developed Scale for assessing the child's behavioral reactions, then the patient's oral cavity is examined with a preliminary demonstration of dental instruments and controlled brushing of teeth by the child in the dental office in the presence of parents.

The fourth module. Carrying out therapeutic and preventive measures.

The objective of the fourth module of measures is the prevention of dental caries and periodontal diseases in children, according to indications – the treatment of dental diseases.

The fourth module of the set activities includes:

- professional oral hygiene using rubber caps (or end brushes) and paste (Figure 16), and ultrasonic cleaning is also used according to indications to remove hard dental deposits;
- the use of the medication "Gluftored" for deep fluoridation according to the following scheme: after brushing and drying the teeth, the teeth are carefully treated with liquid from bottle 1, after one minute the excess material is removed with a dry cotton swab, the enamel of the teeth is treated with liquid number 2, the procedure is repeated after 14 days, and then every 6 months;
- the use of "Biorepair" toothpaste in all study groups except the 5th (control): toothpaste is prescribed for use in the morning and evening;

- the appointment of the medication “Imudon” according to the instructions: dissolve 6 tablets a day for 10 days;

- appointment by a pediatrician inside the medication “Lactobacterin” under the supervision of parents and / or guardians (representatives): 3 times a day for 30-40 minutes before meals, washed down with milk, a course for 3 weeks;

- applications of the “R.O.C.S. Minerals” gel 1 time a day at night for a course of 14 days with an interval between procedures of six months;

- treatment and / or removal of teeth according to indications.

During examinations of the oral cavity, cases of stomatitis of various etiologies were identified (Figure 15). When stomatitis was detected, treatment was carried out using 0.01% solution of miramistin, applications of gel “Herpenox”, sea buckthorn oil.



Figure 15. Patient S., 11 years old, 2nd group. Chronic recurrent aphthous stomatitis.



Figure 16. Paste for professional oral hygiene.

Therapeutic measures included the treatment of dental caries and its complications. Hybrid glass ionomer cement was used in the treatment of dental caries (Figure 17).



Figure 17. Hybrid glass ionomer cement.

CHAPTER 4. RESULTS OF CLINICAL AND PSYCHOLOGICAL RESEARCH

4.1. The developed scale of assessment of behavioral reactions of the child and the methodology of its application

To assess the child's behavior before a visit to the dentist and after the examination, a Scale for assessing the child's behavioral reactions has been developed, which combines objective and subjective assessments of the child's condition.

The study includes an assessment of the child's behavior twice, before and after a visit to the dentist, which is carried out by the doctor himself, and also a two-time color assessment of the child's behavioral reactions.

The scale of assessment of the child's behavioral reactions:

0 points – the child is capricious, does not want to go to the dentist's office, cries, does not contact the doctor;

1 point – the child is capricious, crying, but agrees to carry out manipulations in the dentist's office, provided that the parents (accompanying person) are next to him in the office;

2 points – the child is alert, does not cry, contact, agrees to carry out manipulations at the dentist, provided that the parents (accompanying person) are next to him in the office;

3 points – the child is calm, contact, communicates with the doctor, agrees to carry out manipulations at the dentist, provided that the parents (accompanying person) are next to him in the office;

4 points – the child is calm, contact, communicates with the doctor, agrees to carry out manipulations at the dentist without the presence of parents (accompanying person).

The color assessment of the child's behavioral reactions was carried out before and after a visit to the dentist according to the following method: children were offered a choice of four colored pencils (black, blue, yellow, red) and asked to color the drawing with the color they like more now. The drawings were evaluated according to the following criteria:

0 points – the child refuses to draw, cries;

1 point – the drawing is filled in with fuzzy lines that go beyond the boundaries of the drawing, black color prevails / the drawing is filled in with smooth and clear lines that do not go beyond the drawing, black color prevails;

2 points – the drawing is filled in with fuzzy lines that go beyond the boundaries of the drawing, black and red colors prevail / the drawing is filled in with smooth and clear lines that do not go beyond the drawing, black and red colors prevail;

3 points – the drawing is filled in with fuzzy lines that go beyond the boundaries of the drawing, blue and yellow colors prevail / the drawing is filled in with smooth and clear lines that do not go beyond the drawing, blue and yellow colors prevail;

4 points – the drawing is filled in with fuzzy lines that go beyond the boundaries of the drawing, only blue and yellow colors are used / the drawing is filled in with smooth and clear lines that do not go beyond the drawing, only blue and yellow colors are used.

During the training sessions, the behavior of patients before and after classes was studied (Figures 18, 19).

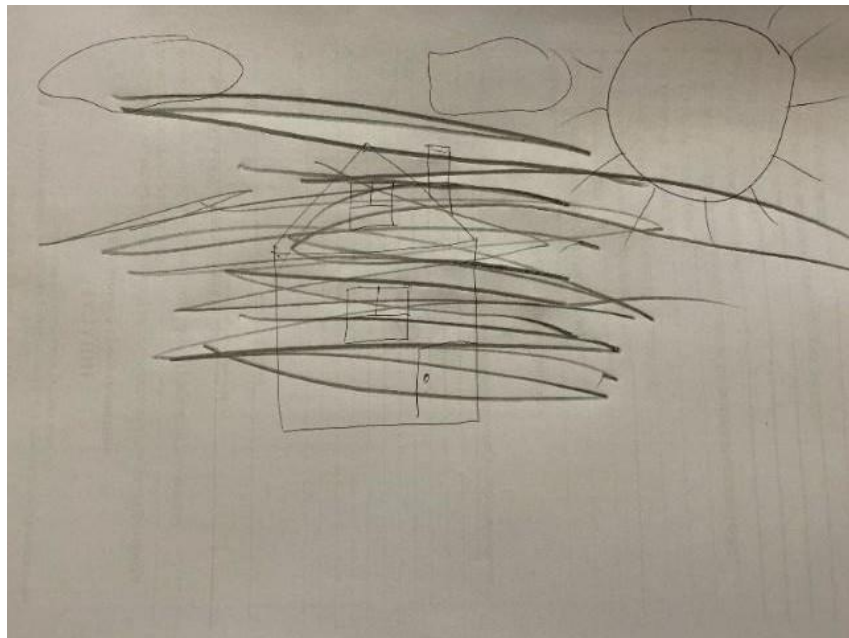


Figure 18. Patient V., 11 years old, group 2, condition before classes. The predominant color is black.

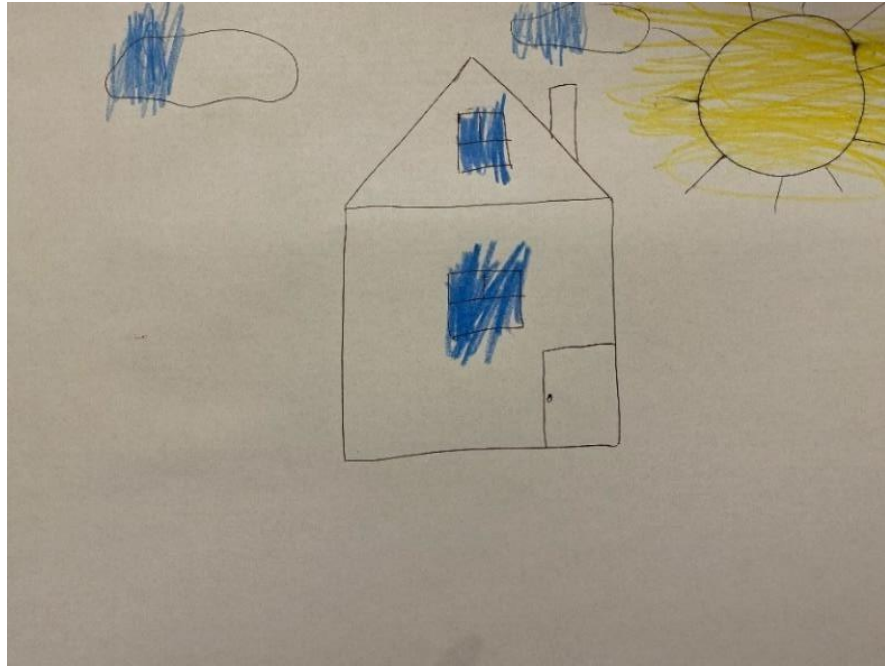


Figure 19. Patient V., 11 years old, group 2, condition after classes (after 2 months) and examination by a pediatric dentist. Yellow and blue colors prevail.

After the examination, a summary table is filled in (Table 6), in which the numerical indicators are summarized and a final assessment of the child's behavioral reactions is carried out.

Table 6 - Summary table of assessment of behavioral reactions of the child, an example of filling in

Full name, age of the child	Scores on the child's behavioral reactions assessment scale before visiting a dentist	Scores on the child's behavioral reactions assessment scale after visiting a dentist	Scores on the color scale for assessing the child's behavioral reactions before visiting a dentist	Scores on the color scale for assessing the child's behavioral reactions after visiting a dentist	The amount of points before and after the visit to the dentist
Patient F., 10 years old	0	1	0	1	2
The result: 2 points – the child is non-contact, unsatisfactory behavior, the prognosis for treatment by a dentist is unfavorable. It is necessary to conduct training activities for at least 2-3 weeks.					

Interpretation of the results obtained:

0-4 points – the child is non-contact, unsatisfactory behavior, the prognosis for treatment by a dentist is unfavorable;

5-9 points – the child is capricious, contactable, needs cognitive behavioral therapy using game methods of psychotherapy, the behavioral response is satisfactory, the prognosis for treatment by a dentist - treatment is possible after a course of training activities;

10-12 points – the child is in contact, the behavioral reaction is favorable, the prognosis for treatment by a dentist - treatment is possible after a minimum course of training activities;

13-16 points – the child is contact, the behavioral response is good, dental treatment is possible without training activities.

4.2. The results of assessing the behavior of children when visiting a dentist and conducting preparatory training activities

At the beginning of the study, without the training module of the set (M0), out of 123 children with neuropsychiatric disorders, only 4 children ($3.3 \pm 1.6\%$) agreed to go to the dentist's office and sit in the dental chair, while the children held their parents tightly by the hand, and only 1 child (0.8%) agreed to open his mouth and inspect the oral cavity.

These data are consistent with the opinion of Professor V.V. Kovaleva (2013) that despite the differences in the clinical picture in different neuropsychiatric disorders in children aged 8-12, they are united by the same predominant affective level of neuropsychiatric response to adverse effects. This level is characterized by general increased excitability, anxiety, dyssomnia, negativism, a tendency to form fears [51].

During the clinical and psychological examination of 185 children of five groups, according to the developed Scale for assessing the behavioral reactions of a child out of 123 children with neuropsychiatric disorders, 118 children ($95.9 \pm 1.8\%$) scored 0-1 points, 4 children ($3.3 \pm 1.6\%$) - 2 points, 1 child (0.8%) – 8 points. In general, the result of the test is unsatisfactory, the behavior of children is sharply negative, dental manipulations were impossible during the first visit.

The results of the primary assessment of the behavior of children of the 4th group (30 children without neuropsychiatric disorders): one child ($3.3 \pm 2.3\%$) – 9 points, 4 children ($13.3 \pm 6.3\%$, $p < 0.05$) – 10-12 points, 13 children ($43.3 \pm 9.2\%$) – 13-14 points, 12 children ($40.0 \pm 9.1\%$) – 15-16 points. Differences from the results of the examination of children with neuropsychiatric disorders are significant ($p < 0.001$).

Results of the primary assessment of the behavior of children of the 5th group (32 children without neuropsychiatric disorders): 1 child ($3.1 \pm 2.3\%$) received a score of 8 points, 3 children ($9.4 \pm 5.2\%$, $p < 0.05$) – 10-12 points, 19 children ($59.4 \pm 8.2\%$) – 13-14 points, 9 children ($28.1 \pm 8.1\%$) – 15-16 points. The differences from the results of the examination of children with neuropsychiatric disorders are significant ($p < 0.001$), the differences between the 4th and 5th groups are insignificant ($p > 0.05$).

The primary assessment of the behavior of all 62 children without neuropsychiatric disorders: 2 children ($3.2 \pm 2.3\%$) received a score of 8-9 points, 7 children ($11.3 \pm 4.1\%$) - 10-12 points, 32 ($51.6 \pm 6.4\%$) children – 13-14 points, 21 children ($33.9 \pm 6.1\%$) – 15-16 points. These data differ significantly from the indicators of children with neuropsychiatric disorders ($p < 0.001$). As a result, with more or less time spent by a pediatric dentist, all 62 children were treated.

After the primary examination, parents were given all the materials of training events, parents received explanations and instructions for conducting classes with children.

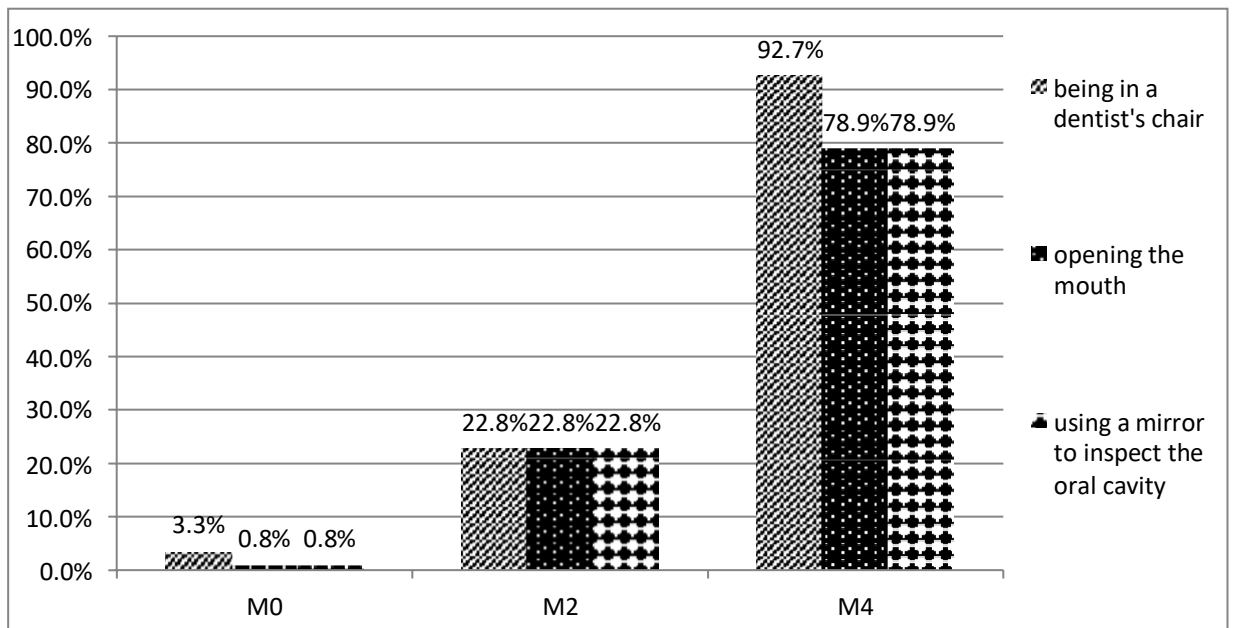


Figure 20. Dynamics of behavior of children with neuropsychiatric disorders during the training module of the set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders

After 2 months of training (M2), a certain positive dynamics of results was noted, namely: out of 123 children with neuropsychiatric disorders, 28 ($22.8 \pm 3.8\%$) children agreed to go to the dentist's office and sit in a dental chair, open their mouths and inspect the oral cavity using a dental mirror (Figure 20), to carry out hygienic and preventive measures; 4 children ($3.3 \pm 1.6\%$) did not show up for an appointment.

The results of the assessment of behavioral reactions of group 4 (30 children without neuropsychiatric disorders who received a set of educational and therapeutic measures to prevent the development of oral diseases in children with certain mental health disorders) after two months of training showed favorable dynamics, significantly differing from the data of the primary examination ($p < 0.05$) according to the indicator of the number of children with a score of 15-16 points: one child ($3.3 \pm 2.3\%$) – 11 points, 7 children ($23.3 \pm 7.9\%$) – 13-14 points, 22 children ($73.3 \pm 8.2\%$) – 15-16 points. Differences from the results of the examination of children with neuropsychiatric disorders are also significant ($p < 0.001$).

The results of the assessment of the behavior of children of the 5th group (32 children without neuropsychiatric disorders who did not receive a set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with some mental health disorders) differ significantly from the data of children of the 4th group ($p < 0.001$) in terms of the number of children with an assessment of 15-16 points, without significant differences from the results of the primary examination: 1 child ($3.1 \pm 2.3\%$) received a score of 9 points, 3 children ($9.4 \pm 5.2\%$, $p < 0.05$) – 10-12 points, 19 children ($59.4 \pm 8.2\%$) – 13-14 points, 9 children ($28.1 \pm 8.1\%$) – 15-16 points. Differences from the results of the examination of children with neuropsychiatric disorders are significant ($p < 0.001$).

The results of the examination of 123 children with neuropsychiatric disorders according to the developed Scale for assessing the child's behavioral reactions 3 months after the start (M3) of training activities revealed significant differences from the results of the primary examination and examination 2 months after the start of training ($p < 0.001$):

- 4 children ($3.3 \pm 1.6\%$) did not show up for an appointment;
- 54 children ($43.9 \pm 4.5\%$) scored 4 points, which is assessed as an unsatisfactory indicator, however, during the color test, all children used blue and yellow colors in the drawings, which indicates positive dynamics in the child's behavior;
- 37 children ($30.1 \pm 4.2\%$) – 6 points, assessed as a satisfactory indicator of the child's behavioral reactions, the children are in contact, communicated with the doctor, used all 4 colors in their drawings, preferred blue and yellow, but refused to go to the office;
- 19 ($15.5 \pm 3.3\%$) – 7-9 points, the children were in contact, communicated with the doctor, used all 4 colors in their drawings, preferring blue and yellow colors, agreed to go to the office and after a conversation with a doctor of varying duration agreed to open their mouths and perform hygienic and preventive manipulations;
- 9 children ($7.3 \pm 2.4\%$) – 10-12 points, favorable result and prognosis for treatment by a dentist. They used blue and yellow colors in their drawings. The

children are in contact, allow for oral examination, hygienic and preventive manipulations and treatment of dental caries.

After 4 months in (M4) after the start of the training activities, the 3rd assessment of children's behavioral reactions and an examination of the oral cavity was carried out.

114 (92.7±2.4%) of 123 children with neuropsychiatric disorders agreed to go to the dentist's office accompanied by their parents, sit in a dental chair and open their mouth, but only 97 patients (78.9±3.7%) allowed to conduct an oral examination using a mirror and professional oral hygiene.

According to the developed Scale of assessment of the child's behavioral reactions, after 4 months of training, 97 (78.9±3.7%) children with neuropsychiatric disorders received a score of 10-12 points and a favorable prognosis for treatment by a dentist, 17 children (13.8± 3.1%) scored 9 points, but were not ready for manipulation in the oral cavity by a dentist, 4 patients (3.3±1.6%) scored 7 points, which characterizes their behavior as satisfactory and the prognosis of consent to dental treatment in the future is favorable. 5 patients (4.1±1.8%) dropped out of the study.

Thus, when examined after 4 months of training, the behavior of children with neuropsychiatric disorders significantly ($p<0.05$) differed from the indicators of the primary examination and similar indicators after 2 months of training.

When examined 6 months (M6) after the start of training, all 118 patients (95.9± 1.8%) with neuropsychiatric disorders who took part in the study at that time, during the examination, with more or less time spent talking to a doctor, agreed to an examination of the oral cavity with a dental mirror; 116 children (94.3±2.1%) agreed to medical manipulations in the oral cavity. The differences with groups of mentally healthy children are insignificant ($p>0.05$).

Thus, after the correction of the behavioral reactions of patients with neuropsychiatric disorders through the training activities of the set, it was possible to carry out hygienic and preventive measures for 116 children (94.3 ± 2.1%), as well as to treat, remove (according to indications) teeth without the use of general anesthesia. The results of treatment are given in section 5.6.

CHAPTER 5. EVALUATION OF THE EFFECTIVENESS OF A SET OF EDUCATIONAL AND THERAPEUTIC AND PREVENTIVE MEASURES TO PREVENT THE DEVELOPMENT OF ORAL DISEASES IN CHILDREN WITH CERTAIN MENTAL HEALTH DISORDERS AND ITS DISCUSSION

5.1. Results of teaching oral hygiene skills to children with neuropsychiatric disorders

To practice oral hygiene skills, a coloring book for children has been developed, where it is shown in an accessible form what causes can lead to the appearance of a carious process of teeth in children, describes what activities will help to preserve oral health.

At the beginning of classes, parents themselves brushed their children's teeth 2 times a day. As the training activities were carried out, after 1.5–2 months, the parents of some children noted that they could entrust the brushing of teeth to children on their own, but under the supervision of adults.

According to parents, children with neuropsychiatric disorders at the beginning of the course of training activities did not brush their teeth on their own and did not allow their parents to carry out manipulations. Classes were held with children 3 times a week during the first month of training.

The second month of training was devoted not only to watching a slide movie and practicing oral hygiene skills on toys, but also to explaining the causes of dental caries to children in pictures using the developed coloring book.

After 4 months of training, parents were able to entrust tooth brushing to 55 children out of 118 ($46.6 \pm 4.6\%$).

After 6 months, 108 children ($91.5\pm 2.6\%$) with neuropsychiatric disorders were able to brush their teeth independently under parental supervision. It should be borne in mind that parents had to constantly monitor the brushing of teeth.

It should be emphasized that significant differences in teaching hygiene skills to children with various neuropsychiatric disorders could not be identified.

Among 62 children who did not suffer from neuropsychiatric diseases, all patients (100%) brushed their teeth on their own. Parents of children of the 4th group, among whom preventive measures were carried out, periodically monitored the regularity of self-conducted individual oral hygiene of children, children of the 5th group brushed their teeth independently without parental control.

Thus, the results of six months of training in individual oral hygiene measures for children with neuropsychiatric disorders can be assessed as successful.

Among the children of the 4th and 5th groups who do not suffer from neuropsychiatric disorders, all patients (100%) brushed their teeth on their own. Parents of children of the 4th group, among whom preventive measures were carried out, periodically monitored the regularity of self-conducted individual oral hygiene of children, children of the 5th group brushed their teeth independently without parental control.

5.2. The impact on the state of oral hygiene of a set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders

Among all examined children with neuropsychiatric disorders, the average hygiene index of Yu.A. Fedorov-V.V. Volodkina (1968) at the primary examination was 3.81 ± 0.72 points, among the examined mentally healthy children - 1.75 ± 0.41 points, $p<0.05$.

After 18 months, among all examined children with neuropsychiatric disorders, this indicator was 2.63 ± 0.44 points, among the examined mentally healthy children - 1.31 ± 0.27 points, $p < 0.05$.

The results of the study of oral hygiene in children with neuropsychiatric disorders are consistent with the studies of E.A. Krasnova (2011), I.M. Losik (2012) [77, 92]. The authors note that only 18% of children had good oral hygiene. Similar data were obtained during the primary examination (table 7).

During the observation, the indicator of the hygiene index of Yu.A. Fedorov-V.V. Volodkina (1968) showed a steady downward trend in groups 1-3 as a result of the application of the developed set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain neuropsychiatric disorders, reaching in group 2 (children with mental retardation) by 18 months of observation significant differences ($p < 0.05$) from the indicator of the primary examination (3.71 ± 0.92 points), while it was assessed, however, as unsatisfactory (2.26 ± 0.21 points).

In the 4th (control) group, where therapeutic and preventive measures were also carried out among mentally healthy children, the hygiene index decreased from 1.77 ± 0.39 at the beginning of the study to 1.46 ± 0.34 points after 6 months.

After 12 months, this indicator was 1.28 ± 0.23 , and after 18 months, 1.16 ± 0.11 points ($p < 0.05$), which is assessed as a good level of oral hygiene.

Thus, the application of the developed set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders contributes to improving the level of oral hygiene.

Table 7 - Dynamics of indicators of the hygiene index of Yu.A. Fedorov-V.V. Volodkina in the groups of the examined, points (M±m)

Survey group	Survey period	Hygiene index of Yu.A. Fedorov-V.V. Volodkina
Group 1, n=17	Primary examination	3,79±0,67
	After 6 months	3,26±0,52
	After 12 months	2,89±0,58
	After 18 months	2,58±0,66
Group 2, n=98	Primary examination	3,71±0,92
	After 6 months	3,21±0,68
	After 12 months	2,85±0,28
	After 18 months	2,26±0,21
Group 3, n=8	Primary examination	3,92±0,58
	After 6 months	3,56±0,39
	After 12 months	3,29±0,49
	After 18 months	3,06±0,46
Group 4, n=30	Primary examination	1,77±0,39
	After 6 months	1,46±0,34
	After 12 months	1,28±0,23
	After 18 months	1,16±0,11
Group 5, n=32	Primary examination	1,72±0,47
	After 6 months	1,53±0,38
	After 12 months	1,51±0,39
	After 18 months	1,46±0,42

To assess the effectiveness of therapeutic and preventive measures, an intergroup comparison of the indicators of the Hygiene Index of Yu.A. Fedorov-V.V. Volodkina (1968) was carried out (Table 8.).

Table 8 - The Mann-Whitney criterion for the hygiene index indicator by Yu.A. Fedorov-V.V. Volodkina, intergroup comparisons 1-4 with the control group depending on the timing

p-value	Group 1	Group 2	Group 3	Group 4
Primary examination	p<0,001	p<0,001	p<0,001	p=0,5;
After 6 months	p<0,001	p<0,001	p<0,001	p=0,3;
After 12 months	p<0,001	p<0,001	p<0,001	p<0,001
After 18 months	p<0,001	p<0,001	p<0,001	p<0,001

As can be seen from Table 8, in the groups where therapeutic and preventive measures were carried out, positive dynamics was revealed after treatment with significant differences with the indicators of the control group 5.

5.3. The results of the influence on the intensity of dental caries of the use of a set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders

In the course of research and application of a set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders, carious cavities were treated according to indications. In this regard, the structure of the DMF, DMF+the number of carious and filled teeth of temporary bite indices changed due to an increase in the number of filled teeth (F). Also, removal was performed according to the indications of teeth with chronic and aggravated chronic periodontitis.

In groups 1-3, significantly higher indicators of the intensity of the carious process ($p < 0.05$) were registered before the start of the study than in the 4th and 5th (control) groups.

So, for example, in children with mental retardation (group 2) before the study, the index of DMF, DMF+the number of carious and filled teeth of temporary bite was equal to 4.41 ± 1.98 . The highest index was registered in group 1 (children suffering from schizophrenia), and amounted to 5.05 ± 0.91 .

The DMF, DMF+the number of carious and filled teeth of temporary bite of teeth in group 3 (children with autism) was 4.96 ± 0.07 at the primary examination. The high prevalence and intensity of the carious process in children with autism is associated with a reduced interest in personal hygiene, uncontrolled hand movements, detachment from the outside world. A visit to a dentist for children with autism is always associated with a sense of anxiety and distrust, so help for such children is usually provided with the development of severe pain syndrome. However, it is worth noting the favorable dynamics of the hygiene index after the application of the developed set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders. Similar data are given in their studies by I.M. Losik and T.N. Terekhova (2011) [94, 161].

The average increase in the intensity of dental caries during examination 18 months after the start of the study among children of the 5th (control) group, in which preventive measures were not carried out, was 0.63 points.

The increase in the intensity of dental caries during examination 18 months after the start of the study was 0.32 points in group 1, which corresponds to a reduction in the intensity of dental caries compared to the control group 5 49.2%.

In the 2nd group of children, the increase in the intensity of dental caries after 18 months was 0.28 points, which corresponds to a reduction in the intensity of dental caries of 55.6%.

In the 3rd group of children, the increase in the intensity of dental caries after 18 months was 0.29 points, the reduction in the intensity of dental caries was 54.0%.

The minimum increase in the intensity of dental caries (0.21 points) 18 months after the start of the set of therapeutic and preventive measures was detected in children of the 4th group (who did not suffer from neuropsychiatric disorders), respectively, the reduction of the increase in the intensity of dental caries was the maximum among the examined - 66.7% (figures 21, 22).

The average increase in the intensity of dental caries after 18 months among the examined children with neuropsychiatric disorders was 0.30 ± 0.10 points.

The average reduction of the increase in the intensity of dental caries among the examined children with neuropsychiatric disorders compared to the control group 5 was $52.9 \pm 1.6\%$ on the background of the use of a set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders.

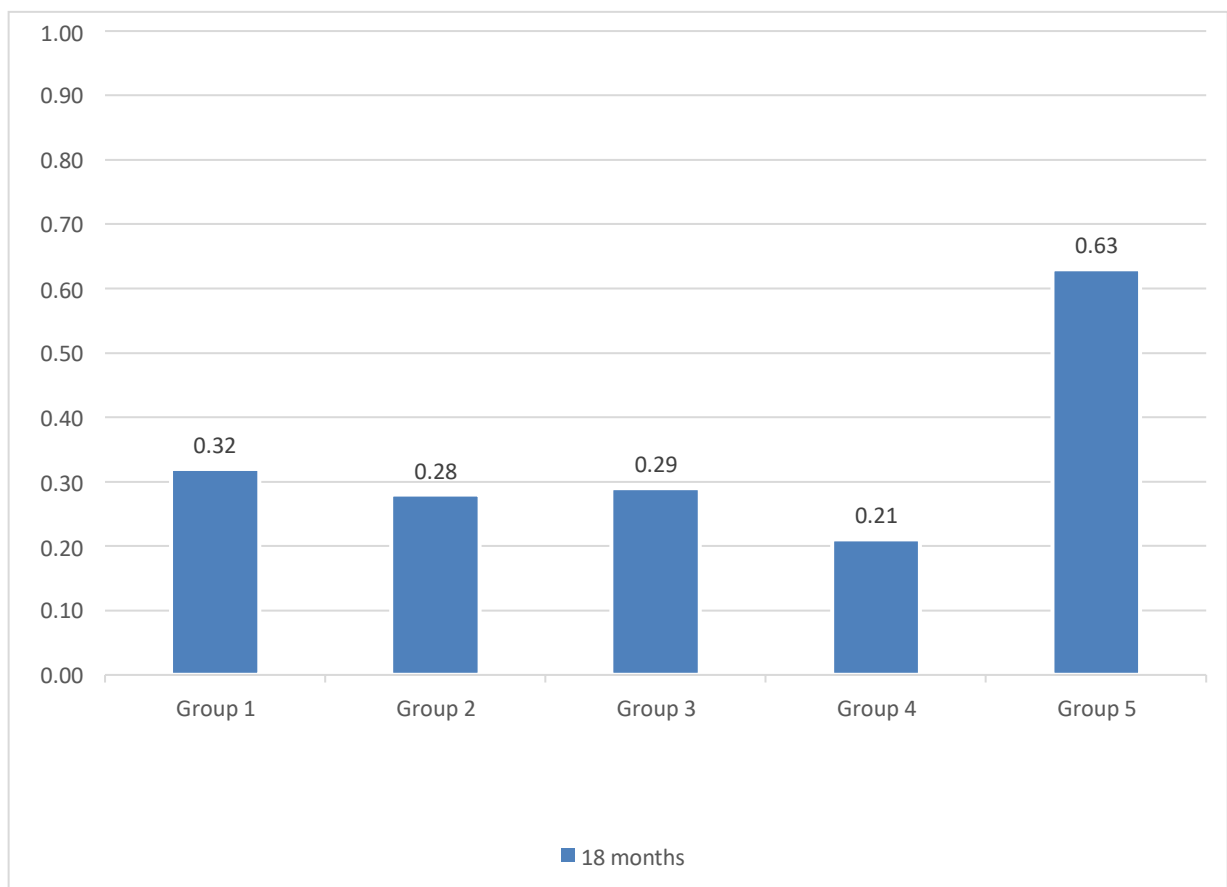


Figure 21. Increase in the intensity of the carious process in 1-5 groups of the patients.

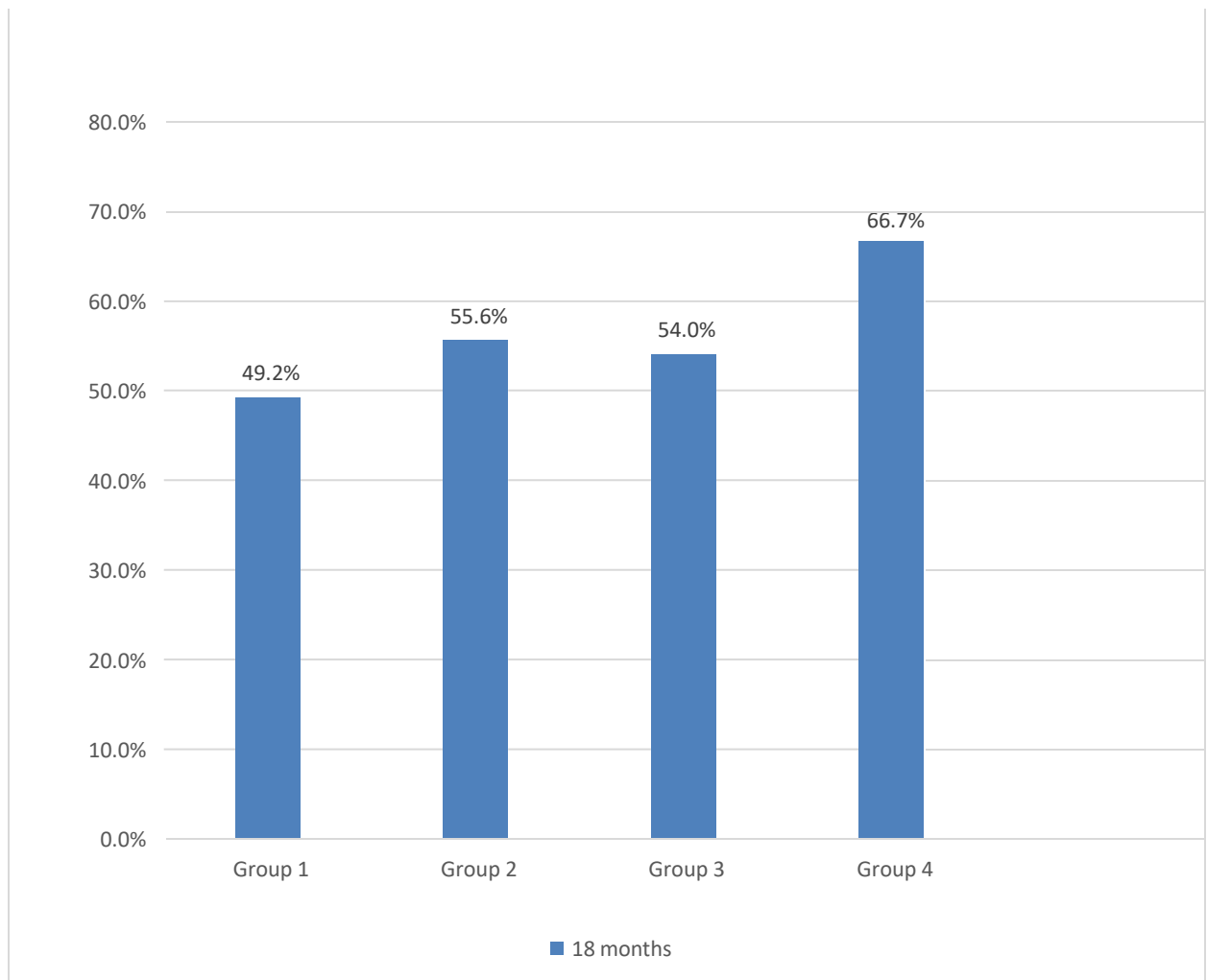


Figure 22. Reduction of dental caries in the patients of groups 1-4.

Thus, a comparative analysis of the indicators of reduction of the growth of the carious process indicates the effectiveness of the developed set of therapeutic and preventive measures among children of groups 1-4.

5.4. Results of the effect on the condition of periodontal tissues of the use of a set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders

Analysis of the results of the primary examination revealed a high level of the complex periodontal index (CPI) of P.A. Leus (1988) in children of the 1st group suffering from schizophrenia (Table 9), it was 2.42 ± 0.24 points, which is estimated as a periodontal disease of moderate severity. Most likely, this is due to the frequent

presence of children in a psychiatric hospital, where little attention is paid to oral hygiene. It should also be taken into account that in the treatment of schizophrenia, medications are used that reduce the activity of the salivary glands and the production of saliva, and this, in turn, negatively affects the protective mechanisms of the oral cavity. However, after the therapeutic and preventive measures carried out, a tendency to decrease in the CPI index was revealed, and after 18 months it amounted to 2.18 ± 0.24 points ($p > 0.05$).

Also, high indicators of the CPI index were registered in the 2nd and 3rd groups and amounted to 2.24 ± 0.19 and 2.39 ± 0.21 points, respectively.

The average index of CPI (P.A. Leus, 1988) among all children with some neuropsychiatric disorders was 2.35 ± 0.21 points.

After 6 months of rehabilitation measures in all study groups, we found a tendency to decrease the indicator to the following levels: in the 2nd group to 2.13 ± 0.16 , in the 3rd group to 2.23 ± 0.29 points, respectively.

The prevalence of chronic catarrhal gingivitis among patients of groups 1-3 was $88.6 \pm 2.9\%$.

In the 4th and 5th (control) groups of mentally healthy children, the CPI indicators at the primary examination were low and amounted to 1.25 ± 0.17 and 1.26 ± 0.16 points, respectively. However, it is necessary to say about the tendency to decrease the CPI indicator in the 4th (control) group six months after the start of therapeutic and preventive measures to 1.03 ± 0.25 points ($p > 0.05$).

After 12 months of carrying out a set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders in all groups, there was a tendency to further decrease in the CPI index, which was 2.24 ± 0.23 in group 1, 2.03 ± 0.14 in group 2, and 2.20 ± 0.34 points in group 3. In group 4, after the measures of the developed set, the index of the CPI index was 0.66 ± 0.33 , which significantly differs from the indicator before treatment ($p < 0.05$). In the 5th (control) group, this indicator was 1.16 ± 0.24 points, without significant differences from the indicator at the primary examination.

After 18 months of conducting the events, a decrease in the CPI index was registered in the main groups, and it amounted to 2.18 ± 0.24 – in group 1 ($p > 0.05$), 1.77 ± 0.11 - in group 2 ($p < 0.05$) and 2.16 ± 0.31 points in group 3 ($p > 0.05$), the average among all examined children with some neuropsychiatric disorders was 2.04 ± 0.15 points. In the 4th and 5th (control) groups after 18 months, the CPI index was equal to 0.37 ± 0.22 ($p < 0.05$) and 1.14 ± 0.23 points ($p > 0.05$), respectively.

Thus, a significant ($p < 0.05$) decrease in the CPI index was revealed in the 2nd (children with mental retardation) and 4th (control) groups compared to the data of the primary examination.

Table 9 - Dynamics of indicators of the CPI index (P.A. Leus, 1988) in the groups surveyed, points ($M \pm m$)

Survey group	Survey period	CPI index (P.A. Leus, 1988), points
Group 1, n=17	Primary examination	$2,42 \pm 0,24$
	After 6 months	$2,29 \pm 0,22$
	After 12 months	$2,24 \pm 0,23$
	After 18 months	$2,18 \pm 0,24$
Group 2, n=98	Primary examination	$2,24 \pm 0,19$
	After 6 months	$2,13 \pm 0,16$
	After 12 months	$2,03 \pm 0,14$
	After 18 months	$1,77 \pm 0,11^*$
Group 3, n=8	Primary examination	$2,39 \pm 0,21$
	After 6 months	$2,23 \pm 0,29$
	After 12 months	$2,20 \pm 0,34$
	After 18 months	$2,16 \pm 0,31$
Group 4, n=30	Primary examination	$1,25 \pm 0,17$
	After 6 months	$1,03 \pm 0,25$

Continuous of table 9

	After 12 months	0,66±0,23*
	After 18 months	0,37±0,22*
Group 5, n=32	Primary examination	1,26±0,16
	After 6 months	1,19±0,22
	After 12 months	1,16±0,24
	After 18 months	1,14±0,23

Note: * – the difference is significant with the index of the primary examination, $p < 0.05$.

An intergroup comparison of CPI according to the Mann-Whitney criterion is presented in Table 10.

Table 10 - The results of the significance of differences in the Mann-Whitney criterion of CPI indicators when comparing the data of primary and subsequent examinations for groups 1-4.

	Group 1 n=17	Group 2 n=98	Group 3 n=8	Group 4 n=30
After 6 months	p=0,1	p<0,001	p=0,03	p=0,01
After 12 months	p=0,003	p<0,001	p=0,009	p=0,0006
After 18 months	p=0,0001	p<0,001	p=0,001	p<0,001

As can be seen from Table 10, the use of the developed set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain neuropsychiatric disorders had a significant positive effect on the condition of periodontal tissues.

Thus, the application of the developed set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders has a beneficial effect on the condition of periodontal tissues.

The data obtained are consistent with similar studies by a number of other authors. For example, according to A.P. Chechelya (1967), the prevalence of periodontal diseases in patients with mental illnesses was 88.53% [155].

5.5. The results of the effect on the pH of saliva of the use of a set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders

The pH of saliva of children of groups 1-3 before the start of the set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with some mental health disorders was significantly lower than the pH of saliva of children of the 4th and 5th (control) groups ($p < 0.05$), which indicates the presence of a cariesogenic situation among patients of groups 1-3.

Saliva pH values in the 4th and 5th (control) groups during the primary examination also turned out to be slightly lower than normal, amounting to 7.11 ± 0.14 and 7.12 ± 0.11 , respectively, most likely due to the influence of age-appropriate hormonal background in children.

Among all examined children with neuropsychiatric disorders, the average saliva pH at the primary examination was 6.18 ± 0.16 , among children without them - 7.12 ± 0.16 ($p < 0.05$).

As a result of the complex measures, patients of groups 1-4 showed a tendency to increase the saliva pH ($p > 0.05$) due to improved oral hygiene; in patients of group 5 who did not take these measures, the saliva pH index practically did not change (Table 11).

Analyzing the results of the study, we can note the positive dynamics of saliva pH in groups 1-4. It is worth emphasizing that in the 5th (control) group, therapeutic and preventive measures were not carried out and the children used oral care products at the discretion of their parents. Therefore, no changes in indicators were detected in this group.

Table 11 - Dynamics of saliva pH indicators in the groups examined, units (M±m)

Survey group	Survey period	Saliva pH, units
Group 1, n=17	Primary examination	6,17±0,16*
	After 6 months	6,20±0,14
	After 12 months	6,23±0,13
	After 18 months	6,29±0,17
Group 2, n=98	Primary examination	6,17±0,19*
	After 6 months	6,19±0,15
	After 12 months	6,24±0,17
	After 18 months	6,31±0,14
Group 3, n=8	Primary examination	6,21±0,14*
	After 6 months	6,24±0,16
	After 12 months	6,28±0,17
	After 18 months	6,34±0,18
Group 4, n=30	Primary examination	7,11±0,12
	After 6 months	7,14±0,16
	After 12 months	7,17±0,17
	After 18 months	7,19±0,14
Group 5, n=32	Primary examination	7,12±0,19
	After 6 months	7,10±0,14
	After 12 months	7,13±0,15
	After 18 months	7,11±0,13

Note: * – the difference is significant with the indicator of the control group, $p < 0.05$.

Thus, the results of the saliva pH study are consistent with the data of N.V. Rupasova (2011), who found that the saliva pH in patients with schizophrenia is shifted to the acidic side and is 6.13 ± 1.58 , which increases the risk of carious process[132].

Table 12 - The level of significance of differences in the Mann-Whitney criterion for saliva pH, intergroup comparisons 1-4 with the control group, depending on the timing

p-value	Group 1	Group 2	Group 3	Group 4
Primary examination	p<0,001	p<0,001	p<0,001	p=0,56;
After 6 months	p<0,001	p<0,001	p<0,001	p=0,59;
After 12 months	p<0,001	p<0,001	p<0,001	p=0,8;
After 18 months	p<0,001	p<0,001	p<0,001	p=0,9;

Table 12 presents the levels of reliability of differences in the Mann-Whitney criterion for evaluating the effectiveness of therapeutic and preventive measures. Analyzing the table of intergroup comparison, we can conclude about the significance of differences in indicators before treatment, during treatment and after treatment, as well as about the positive effect of the developed set of measures on the pH of saliva.

5.6. Results of dental treatment after a set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders

During the primary examination, it was found that children suffering from neuropsychiatric disorders are affected by dental caries, gingivitis more often than children without mental health disorders. One of the predisposing factors to the development of oral diseases is a shift in the pH of saliva to the acidic side.

After conducting training activities of a set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders, it was possible to carry out hygienic and preventive measures for 116 children ($94.3 \pm 2.1\%$), as well as to treat, remove (according to indications) teeth affected by caries without the use of general anesthesia.

Group 1 patients suffering from schizophrenia received 26 fillings for dental caries, 9 fillings for pulpitis, 4 temporary teeth were removed for exacerbation of chronic periodontitis.

For the children of the 2nd group suffering from mental retardation, 127 fillings were applied for dental caries, 19 fillings for pulpitis and chronic periodontitis, 21 temporary teeth were removed for exacerbation of chronic periodontitis.

Group 3 patients with autism received 11 fillings for dental caries, 2 fillings for pulpitis, 3 temporary teeth were removed for exacerbation of chronic periodontitis.

The children of the 4th (control) group who received a complex of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders were given 19 fillings for dental caries, 1 filling for pulpitis.

Mentally healthy patients of the 5th (control) group, to whom preventive measures were not carried out, 24 fillings were applied for dental caries, 3 fillings for pulpitis, one temporary tooth was removed for exacerbation of chronic periodontitis.

Table 13 – Dynamic of DMF (DMFt)

Group	DMF (DMFt)	D	F	M	D	F	M
		Before the start of the survey			After 18 months of survey		
Group 1, n=17	5,06±0,42	4,86	0,03	0,17	2,68	1,29	1,09
Group 2, n=98	4,43±0,44	3,7	0,06	0,67	1,43	1,75	1,25
Group 3, n=8	4,75±0,52	4,61	0,01	0,13	4,41	0,45	0,16
Group 4, n=30	2,93±0,46	1,8	1,07	0,06	1,05	1,18	0,08
Group 5, n=32	2,89±0,37	1,66	1,15	0,08	1,38	1,42	0,09

On the background of the lack of oral hygiene during the initial examination, $88.6 \pm 2.9\%$ of patients of groups 1-3 showed signs of periodontal tissue inflammation (hyperemia, bleeding and swelling of the interdental papillae) corresponding to the diagnosis of chronic generalized catarrhal gingivitis.

Carrying out a set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders, including professional oral hygiene, local application of 0.01% miramistin solution, tablets for resorption in the oral cavity “Imudon”, having an immunocorrecting effect, as well as the probiotic “Lactobacterin” prescribed inside, allowed to normalize the condition of periodontal tissues of the examined patients.

On examination after 2-3 weeks, there was an improvement in oral hygiene and a decrease in the severity of signs of inflammation, namely, a decrease in bleeding and swelling of periodontal tissues during palpation, an increase in the density of interdental papillae and their acquisition of a normal configuration, gum tissue acquired a pale pink color. The dynamics of the indicators of the CPI index by P.A. Leus (1988), reflecting the state of periodontal tissues of patients of groups 1-5, is given in section 5.4.

Chronic recurrent herpetic stomatitis was detected in one patient of the first and one patient of the second group, treatment included the appointment of oral rinses with 0.01% miramistin solution 4 times a day, applications of gel “Herpenox” and sea buckthorn oil 3 times a day.

The immunocorrector “Imudon” and probiotic “Lactobacterin” prescribed in a complex of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders made it possible to achieve remission of chronic recurrent herpetic stomatitis in these patients.

Thus, the results of the study indicate the effectiveness of a set of therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders. The opportunity, according to indications, to treat and remove teeth for children with certain mental illnesses appeared after the training events.

To illustrate, we give clinical examples.

Clinical case 1. Patient R., 11 years old. Diagnosis of the underlying disease: F. 84.0 childhood autism.

At the primary examination he did not complain of pain.

Anamnesis of life: a child from the 3rd pregnancy, the 2nd birth, the mother mentions toxicosis in the second trimester (nephropathy, blood pressure up to 180 mmHg), the mother was twice hospitalized with a diagnosis of “threat of premature birth” in the first and second trimester. The mother also has a history of chlamydia. Delivery on time, rapid. Birth weight 2900 g, height 55 cm. At birth, he did not scream immediately, did not breathe for 3 minutes, resuscitation measures were carried out. The diagnosis was established from the age of 3.

Mental status. The consciousness is clear, he knows his last name and first name, he is oriented in time and space. Speech is limited, tongue-tied, vocabulary is minimal. The child is contact. He serves himself independently, hygienic skills are present. Copes with simple work duties. He gets tired quickly, is emotionally unstable, delirium, hallucinations were not observed. According to the developed Scale of assessment of the child’s behavioral reactions – 5 points, the child is capricious, needs cognitive behavioral therapy using game methods of psychotherapy, the psycho-emotional state is satisfactory, the prognosis for treatment by a dentist - treatment is possible after several training visits.

After carrying out the first and second modules of the set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with some mental health disorders for 2 months, he applied for an appointment accompanied by his mother with complaints of tooth pain 8.5.

Anamnesis of the disease: according to the mother, complaints of pain when eating are on the bottom right. The pain appeared 2 days ago.

The assessment according to the developed Scale of assessment of the child’s behavioral reactions is 8 points (the child is capricious, but is set up for contact with a dentist).

The child agreed in the presence of the mother to an oral examination and treatment by a pediatric dentist.

Objectively: 8.5 the tooth is a deep carious cavity, probing is painless, the temperature test is negative, the percussion of the tooth is sharply painful, the tooth is mobile, mobility of the II degree. The mucous membrane in the area of the tooth 8.5 is hyperemic, painful on palpation (Figure 23).

Yu.A. Fedorov-V.V. Volodkina hygiene index: 3.3 points – assessed as a poor level of hygiene.

The DMF+the number of carious and filled teeth of temporary bite index is 11 (a very high level of intensity of dental caries).

The index of CPI is 2.1 points (the average degree of periodontal lesion).

Diagnosis: K04.5 Exacerbation of chronic periodontitis 8.5.

Treatment: after consultation with neurologists, psychiatrists and pediatricians under conductor mandibular anesthesia Sol. Ubistezini – 1,7 ml tooth 8.5 was removed (Figure 24). Recommendations for oral care are given, hygiene products are selected.



Figure 23. Patient R., 11 years old, 3rd group. Exacerbation of chronic periodontitis 8.5. Clinical picture before tooth extraction.



Figure 24. Patient R., 11 years old, 3rd group. Exacerbation of chronic periodontitis 8.5. The condition immediately after the removal of tooth 8.5.

In the next visit, the treatment of average dental caries 3.6, 7.5 was carried out, the teeth were treated with the medication Gluftored, applications of a remineralizing gel were prescribed for a course of 10 days. The pediatrician prescribed resorption in the oral cavity of Imudon tablets 1 tablet 6 times a day for 7 days, ingestion of Lactobacterin 5 doses 2 times a day for 4 weeks.

When examined after 18 months from the start of the training activities, the patient does not complain of pain.

The result of the survey according to the developed Scale of assessment of the child's behavioral reactions is 10 points – the child is contact, favorable behavior.

The face is symmetrical. Mouth opening is free. The mucous membrane of the oral cavity is pale pink.

Yu.A. Fedorov-V.V. Volodkina hygiene index is 2.1 points (unsatisfactory level of oral hygiene).

No new carious cavities and chalky spots on the enamel of the teeth were revealed.

The DMF+the number of carious and filled teeth of temporary bite index is equal to 11 points (a very high level of caries intensity).

The CPI index is 1.8 points (mild periodontal lesion).

During the control brushing of teeth, the child demonstrates satisfactory oral hygiene skills.

Clinical case 2. Patient F., 10 years old. Diagnosis: F. 84.0 childhood autism.

The patient applied for an appointment accompanied by his mother.

During the primary examination, complaints about “food getting stuck in the teeth”.

Anamnesis of life: a child from the 1st pregnancy, the 1st birth, the mother mentions the phenomena of toxicosis in the second trimester (nephropathy, blood pressure up to 175 mmHg), the mother was on inpatient treatment with a diagnosis of “threat of premature birth” in the first and second trimester. A history of chlamydia, ureaplasmosis. Delivery on time, rapid. The child’s birth weight is 3200 g, height 57 cm. At birth, he did not scream immediately, did not breathe for 3 minutes, resuscitation measures were carried out. The diagnosis was established since the age of

3. According to the mother’s words, the child is not observed by specialized doctors.

Mental status. The consciousness is clear, he knows his last name and first name, he is oriented in time and space. Speech is limited, tongue-tied, vocabulary is minimal. The child is contact. He serves himself independently, hygienic skills are present. Copes with simple work duties. He gets tired quickly, is emotionally unstable, delirium, hallucinations were not observed. The result of the examination according to the developed Scale of assessment of the child’s behavioral reactions is 6 points, the child is capricious, needs cognitive behavioral therapy using game methods of psychotherapy, the psycho-emotional state is satisfactory, the prognosis for treatment by a dentist - treatment is possible after several training visits.

After carrying out the first and second modules of the set of educational and therapeutic and preventive measures to prevent the development of oral diseases in children with some mental health disorders for 2.5 months, he applied for an appointment accompanied by his mother with complaints of tooth pain 6.5.

Anamnesis of the disease: according to the mother's words, complaints of pain when eating are on the top left. The pain appeared 4-5 days ago.

Objectively: tooth 6.5 has a deep carious cavity, the temperature test is negative, the percussion of tooth 6.5 is sharply painful, the tooth is mobile, mobility of the II degree. The mucous membrane in the area of tooth 6.5 is hyperemic, painful on palpation (Figure 25).

The hygiene index of Yu.A. Fedorov-V.V. Volodkina is 3.4 points – a poor level of hygiene.

DMF+the number of carious and filled teeth of temporary bite index is 10 points (very high level of caries intensity)

The CPI index is 2.1 points (the average degree of periodontal lesion).

Diagnosis: K04.5 Exacerbation of chronic periodontitis 6.5.

Treatment: after consultation with a neurologist, psychiatrist, pediatrician, under conductor anesthesia Sol. Ubistezini – 1,7 ml tooth 6.5 was removed (Figure 26). Recommendations for oral care are given, hygiene products are selected.



Figure 25. Patient F., 10 years old, 3rd group. Exacerbation of chronic periodontitis of tooth 6.5. Clinical picture before tooth extraction.



Figure 26. Patient F., 10 years old, 3rd group. Exacerbation of chronic periodontitis of tooth 6.5. The condition immediately after tooth 6.5 extraction.

In the next visit, the treatment of average dental caries 3.6, 5.5 was carried out, the teeth were treated with the medication Gluftored, applications of a remineralizing gel were prescribed for a course of 10 days. The pediatrician prescribed resorption in the oral cavity of Imudon tablets 1 tablet 6 times a day for 7 days, ingestion of Lactobacterin 5 doses 2 times a day for 4 weeks.

When examined after 18 months from the start of the training activities, the patient does not complain of pain.

The result of the survey according to the developed Scale of assessment of the child's behavioral reactions: 10 points – the child is contact, favorable behavior.

The face is symmetrical. Mouth opening is free. The mucous membrane of the oral cavity is pale pink.

Yu.A. Fedorov-V.V. Volodkina hygiene index is 2.1 points (unsatisfactory level of oral hygiene).

There were no new carious cavities and chalky spots on the enamel of the teeth, the DMF+the number of carious and filled teeth of temporary bite index was 10 points (a very high level of intensity of dental caries).

The CPI index is 2.0 points, which corresponds to a mild periodontal lesion.

During the control brushing of teeth, the child demonstrates satisfactory oral hygiene skills.

Thus, after conducting training modules of a set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders, patients were able to receive dental care in an outpatient clinic. The preventive measures carried out provided a certain improvement in the hygienic condition of the oral cavity, a reduction in the risk of dental caries and inflammatory periodontal diseases, which is confirmed by objective index indicators and the absence of newly identified carious cavities and chalky spots during examination.

5.7. Results of correlation analysis of interrelations between indicators of dental status of children with some neuropsychiatric disorders.

Correlation analysis of the data was performed to identify the relationship of dental status indicators in children with neuropsychiatric disorders.

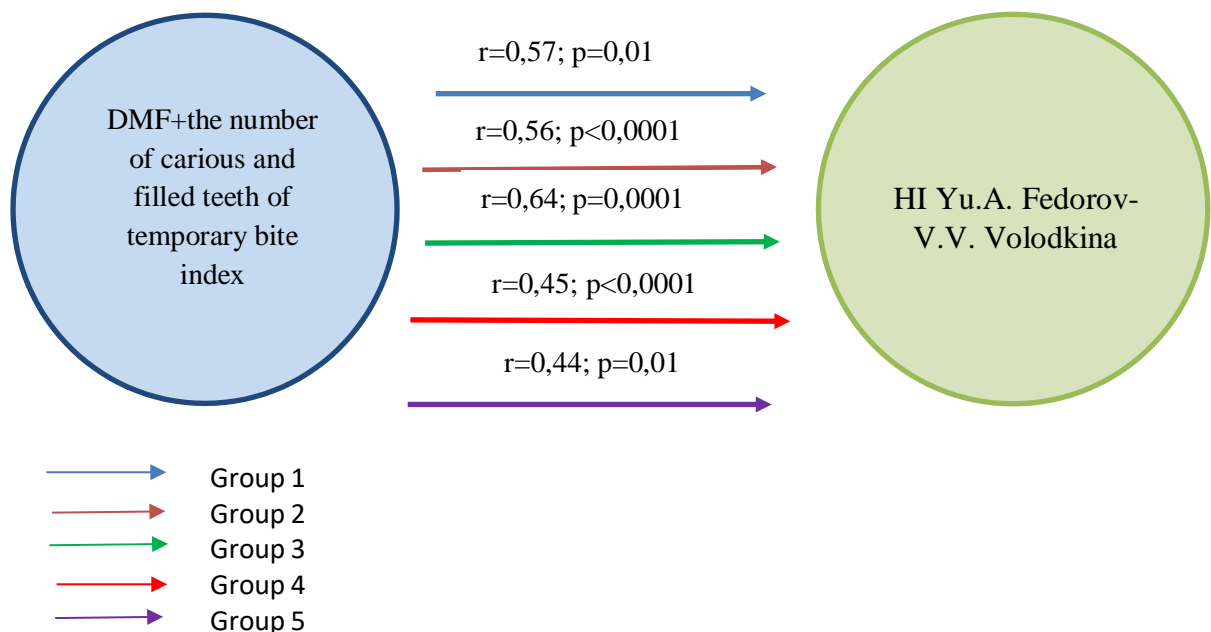


Figure 27. Correlation between the initial indicators of the DMF+the number of carious and filled teeth of temporary bite index of the HI Yu.A. Fedorov-V.V.

Volodkina (1968) in the study groups before the beginning of the research

When considering the correlation dependence of dental health indicators at the beginning of the study, an average direct relationship was found in all study groups between the DMF+the number of carious and filled teeth of temporary bite index and the HI of Yu.A. Fedorov-V.V. Volodkina (Fig. 27). Such a correlation between the two indicators shows a direct dependence of the development of the carious process in case of non-compliance with oral hygiene.

However, not only the development of dental caries depends on the level of oral hygiene, but also the condition of periodontal tissues, therefore, the correlation between the initial indicators of HI Yu.A. Fedorov-V.V. Volodkina and CPI (P.A. Leus, 1988) has been studied. A direct average correlation between the two studied indicators was also revealed (Fig. 28).

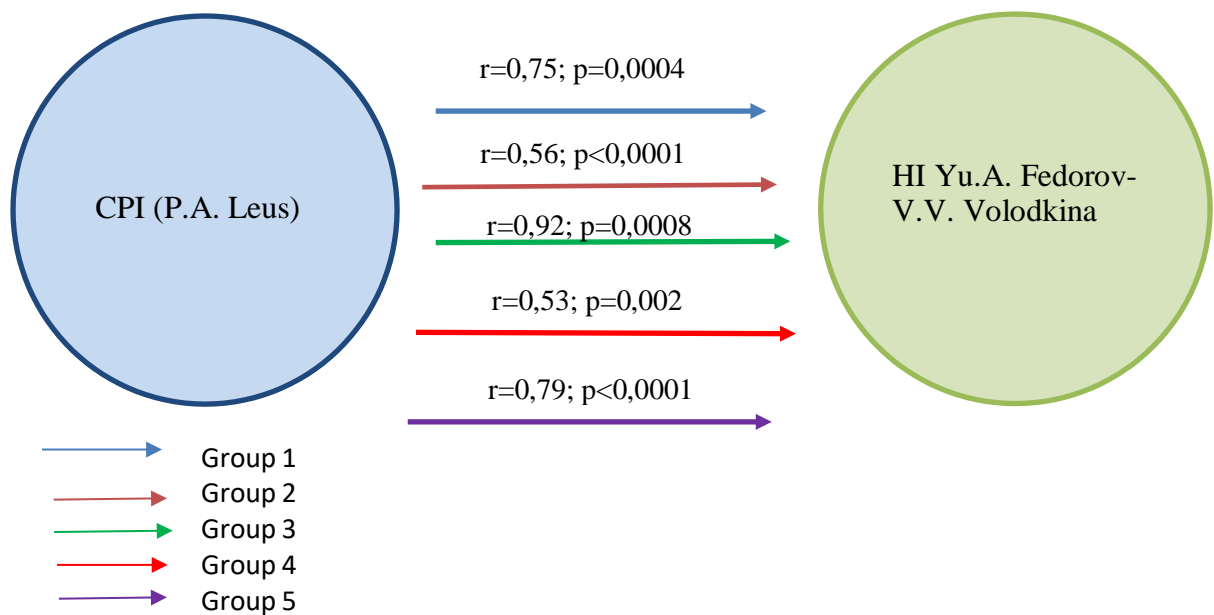


Figure 28. Correlation between the initial indicators of CPI (P.A. Leus, 1988) and HI Yu.A. Fedorova-V.V. Volodkina in the study groups before the research

However, when studying the correlation of dental indicators at the beginning of the research and after 18 months, a weakening of correlations was revealed (Fig. 29, 30).

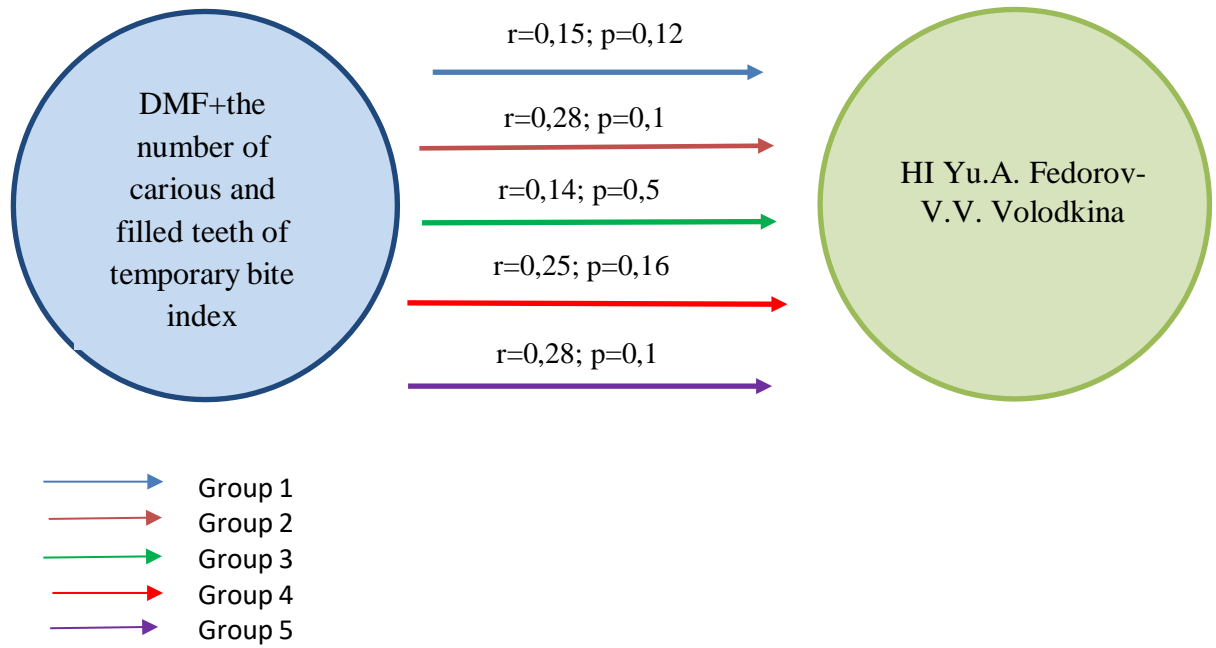


Figure 29. Correlation between the indicators of DMX+the number of carious and filled teeth of temporary bite index and HI Y.A. Fedorova-V.V. Volodkina in the study groups after 18 months

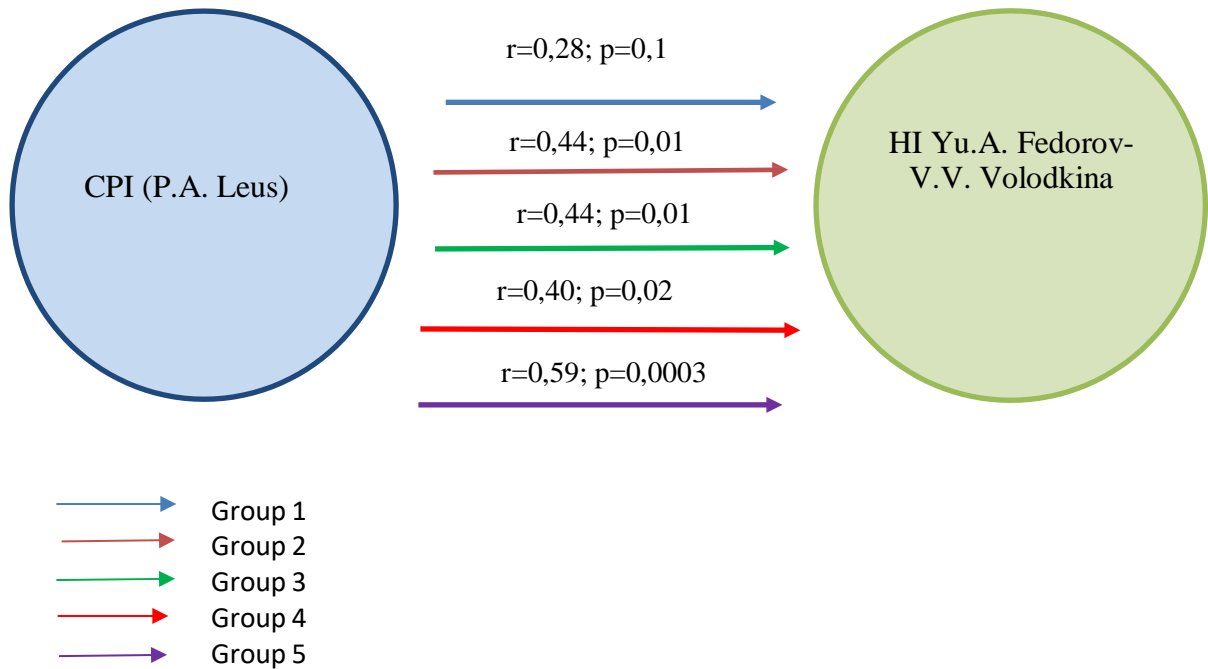


Figure 30. Correlation between the indicators of CPI (P.A. Leus, 1988) and HI Yu.A. Fedorova-V.V. Volodkina in the study groups after 18 months

The weakening of correlations between the studied indicators of the dental status of children can be explained by improving oral hygiene, developing dental cleaning

skills, as well as carrying out a set of therapeutic and preventive measures. The decrease in correlation in group 5, in which therapeutic and preventive measures were not carried out, is insignificant, however, during the primary examination, the children were also given recommendations on oral care, which probably caused a decrease in the relationship between the indicators of the initial and final level of dental status.

The condition of the oral cavity depends on many indicators of the composition of saliva, including such a parameter as the pH of saliva. The correlation analysis of saliva pH and HI of Yu.A. Fedorov-V.V. Volodkina was carried out (Table 14).

Table 14 - Correlation between saliva pH and HI Yu.A. Fedorova-V.V. Volodkina

	Primary examination	After 18 months
Group 1	$r=0,07$; $p=0,8$	$r=0,17$; $p=0,5$
Group 2	$r=0,0003$; $p=0,9$	$r=0,01$; $p=0,9$
Group 3	$r=0,65$; $p=0,07$	$r=0,42$; $p=0,3$
Group 4	$r=0,02$; $p=0,8$	$r=0,13$; $p=0,4$
Group 5	$r=0,09$; $p=0,6$	$r=0,18$; $p=0,3$

Both at the primary examination and after 18 months of the study, a positive correlation was noted, which proves the relationship of the compared indicators: the Hygiene Index indicator directly depends on the pH level of saliva.

SUMMARY

Children suffering from some neuropsychiatric disorders are one of the most vulnerable groups of the population. Patients with mental health disorders have one or more concomitant diseases of organs and systems, including digestive. Detachment from the outside world, lack of interest and motivation for personal hygiene, eating disorders leads to the appearance and aggravation of diseases of the oral cavity, for example, dental caries, inflammatory diseases of periodontal tissues.

To study the prevalence and intensity of dental diseases among children of Primorsky Krai, a dental examination of 432 children aged 8-12 years without neuropsychiatric disorders, including 226 girls and 206 boys, was conducted.

It was found that the prevalence of caries of temporary teeth was $51.6 \pm 2.4\%$, the prevalence of caries of permanent teeth was $31.0 \pm 2.2\%$.

The total index DMF+the number of carious and filled teeth of temporary bite index was 2.87 ± 0.26 points.

The indicator of the hygiene index of Yu.F. Fedorov-V.V. Volodkina was 1.81 ± 0.41 points, the index of the CPI index (P.A. Leus, 1988) was 1.27 ± 0.28 points. There were no cases of prepubescent and juvenile periodontitis. Localized periodontitis on the background of local predisposing factors (a combination of malocclusion, a low level of oral hygiene) was detected in one patient (0.2%), while the depth of periodontal pockets up to 3.5 mm was recorded.

During the study, an in-depth examination of 185 children living in Primorsky Krai was conducted.

The prevalence and intensity of dental caries in children with neuropsychiatric disorders were studied. During the study, we found that the prevalence of caries of both temporary and permanent teeth in children with neuropsychiatric disorders is significantly higher than in the control groups ($p < 0.001$).

Among 17 patients of the 1st group (suffering from schizophrenia), the prevalence of caries of temporary teeth was 100%, permanent teeth – $88.2\pm 8.1\%$ (15 people).

In group 2 (patients suffering from mental retardation), the prevalence of caries of temporary teeth was 100% (98 children), and permanent teeth – $69.4\pm 4.7\%$ (68 children).

Out of 8 patients of the 3rd group suffering from autism, caries damage of temporary teeth was detected in all children (100%), permanent teeth – in 7 children ($87.5\pm 12.5\%$).

Out of 123 examined children with neuropsychiatric disorders, caries of temporary teeth was detected in 123 patients (100%), caries of permanent teeth - in 90 children ($73.2\pm 4.0\%$).

In group 4 (children without neuropsychiatric disorders), caries damage to temporary teeth was found in 17 cases ($56.7\pm 9.2\%$), permanent teeth – in 10 cases ($33.3\pm 8.8\%$) out of 30 examined children.

Out of 32 patients of the 5th group (children without neuropsychiatric disorders), caries of temporary teeth was detected in 16 people ($50.0\pm 9.0\%$), permanent teeth – in 9 children ($28.1\pm 8.1\%$).

In total, out of 62 examined children without identified neuropsychiatric disorders, caries of temporary teeth was detected in 33 ($53.2\pm 6.4\%$), permanent teeth - in 19 ($30.7\pm 5.9\%$).

The values of the index of DMFt and DMF+the number of carious and filled teeth of temporary bite index were $5,06\pm 0,42$, $4,43\pm 0,44$, $4,75\pm 0,52$ points, respectively, in the first, second and third groups of the study. When comparing these indicators with similar ones in the control groups of children who do not have neuropsychiatric disorders and without concomitant pathology of other organs and systems, it was revealed that the index of DMFt and DMF+the number of carious and filled teeth of temporary bite index of children of the 4th and 5th (control) groups of children is significantly lower (2.93 ± 0.46 and 2.89 ± 0.37 points accordingly, $p<0.05$), than in groups 1-3.

During the examination of the oral cavity, it was revealed that the teeth of children suffering from some neuropsychiatric disorders are covered with abundant soft plaque and tartar. When assessing oral hygiene according to Yu.A. Fedorov-V.V. Volodkina (1968), it was found that the HI in 1-3 groups of the study was $3,79\pm 0,67$, $3,71\pm 0,92$, $3,92\pm 0,58$ points, respectively, which is significantly higher ($p<0.05$) than in the 4th and 5th (control) groups ($1,77\pm 0,39$ and $1,72\pm 0,47$ points, respectively). These indicators characterize oral hygiene as very poor. At the same time, it should be noted that all children of the main study groups have reduced oral hygiene, especially when treated in a hospital.

The CPI index (P.A. Leus, 1988) in the main groups of the study exceeded the indicators in the control groups by more than two times and was in the 1st, 2nd and 3rd groups of the study $2,42\pm 0,24$, $2,24\pm 0,19$, $2,39\pm 0,21$ points respectively.

It was found that in the main study groups, the saliva pH was shifted to the acidic side to $6,17\pm 0,16$, $6,17\pm 0,19$, $6,21\pm 0,14$. In the control groups of the study, the results were obtained $7,11\pm 0,12$ in group 4, $7,12\pm 0,19$ in group 5, which corresponds to a slightly alkaline reaction.

The developed set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders is aimed not only at the treatment and prevention of oral diseases, but also at educating children and parents, correcting patient behavior before visiting a pediatric dentist.

When assessing the behavior of patients, a developed Scale for assessing the behavioral reactions of the child was used. The advantage of the Scale is the combination of objective and subjective assessment of the child's condition. During the primary assessment of patients with neuropsychiatric disorders, it was found that in 122 children out of 123, the total number of points ranged from 0 to 2 points, which characterizes the behavior of patients as unsatisfactory, only in 1 child the score was 8 points, which corresponds to satisfactory behavior before dental manipulations. After the training activities, 6 months later, when assessing behavioral reactions in 116

children, the total score was 9-11 points, which corresponds to the satisfactory behavior of children and the possibility of dental manipulations.

Thus, at the beginning of the study, without viewing the training module of the complex, out of 123 children with neuropsychiatric disorders, only 4 children ($3.3 \pm 1.6\%$) agreed to go to the dentist's office and sit in the dental chair, while the children held their parents tightly by the hand, and only 1 child (0.8%) agreed to open his mouth and conduct an oral examination.

After the correction of the behavior of patients with neuropsychiatric disorders, after 6 months, it was possible to carry out hygienic and preventive measures for 116 children ($94.3 \pm 2.1\%$), as well as to treat, remove (according to indications) teeth without the use of general anesthesia.

The effectiveness of preventive measures was assessed using indicators such as an increase in the intensity of the carious process and a reduction in its growth.

The most expressed increase in the intensity of dental caries during examination 18 months after the start of the study was detected among children of the 5th (control) group in which preventive measures were not carried out, the indicator was 0.63 points.

The increase in the intensity of dental caries during examination 18 months after the start of the study was 0.32 points in group 1, which corresponds to a reduction in the intensity of dental caries compared to the control group 5 49.2%.

In the 2nd group of children, the increase in the intensity of dental caries after 18 months was 0.28 points, which corresponds to a reduction in the intensity of dental caries of 55.6%.

In the 3rd group of children, the increase in the intensity of dental caries after 18 months was 0.29 points, the reduction in the intensity of dental caries was 54.0%.

The minimum increase in the intensity of dental caries (0.21 points) 18 months after the start of the set of therapeutic and preventive measures was detected in children of the 4th group (who did not suffer from neuropsychiatric disorders), respectively, the reduction of the increase in the intensity of dental caries was the maximum among the examined - 66.7%.

The developed set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders includes:

Module 1. Oral hygiene training.

Module 2. Hygiene training lessons for parents.

Module 3. Acquaintance with the dentist.

Module 4. Carrying out therapeutic and preventive measures.

All components of the set are designed taking into account the neuropsychiatric disorder of the child, the peculiarities of information perception and are maximally adapted to the mental state of the child.

CONCLUSIONS

1. In children of Primorsky Krai suffering from certain neuropsychiatric disorders (mental retardation, autism, schizophrenia), the prevalence of dental diseases is characterized as high: the prevalence of caries of temporary teeth was 100%, the prevalence of caries of permanent teeth – $73.2 \pm 4.0\%$, the prevalence of chronic catarrhal gingivitis – $88.6 \pm 2.9\%$, the index of the CPI (P.A. Leus, 1988) was 2.35 ± 0.21 points. The prevalence of dental diseases in mentally healthy children of Primorsky Krai is significantly ($p < 0.05$) lower and is characterized as average: the prevalence of caries of temporary teeth was $51.6 \pm 2.4\%$, permanent teeth – $31.0 \pm 2.2\%$, the prevalence of chronic catarrhal gingivitis – $54.6 \pm 2.4\%$, the index of CPI – 1.27 ± 0.28 points.

2. The average saliva pH of children with certain neuropsychiatric disorders was 6.18 ± 0.16 , which is significantly lower ($p < 0.05$) than the average saliva pH of children without neuropsychiatric disorders (7.12 ± 0.16). The state of oral hygiene in children with some neuropsychiatric disorders is significantly worse ($p < 0.05$) than in mentally healthy children. At the same time, the average values of the oral hygiene index were 3.81 ± 0.72 and 1.81 ± 0.41 points, respectively.

3. The behavioral reactions of children with some neuropsychiatric disorders during the initial visit to the dentist are characterized as unsatisfactory, according to the developed Scale of assessment of the child's behavioral reactions, 120 children out of 123 scored 0 to 2 points, which significantly ($p < 0.001$) differs from the indicators of mentally healthy children (9-16 points). Conducting training activities helps them achieve an assessment of 9-11 points during examination after 6 months, which corresponds to a satisfactory and favorable behavioral response of children, in which dental manipulations are possible.

4. A set of educational, therapeutic and preventive measures has been developed to prevent the development of oral diseases in children with certain mental health disorders, the use of which for 18 months contributes to reducing the intensity

of the carious process in children with certain neuropsychiatric disorders to an average of $52.9 \pm 1.6\%$ compared with the control group and reducing the intensity of inflammatory periodontal diseases according to the CPI index on average up to 2.04 ± 0.15 points.

PRACTICAL RECOMMENDATIONS

1. It is advisable to provide dental care to children suffering from mental retardation, autism, schizophrenia in outpatient polyclinic conditions using the developed set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders.
2. For the prevention of inflammatory diseases of periodontal tissues in children with certain neuropsychiatric disorders, it is advisable to conduct a course of immunocorrecting agents once a year.
3. Professional oral hygiene for children with certain neuropsychiatric disorders is recommended at least twice a year with simultaneous training activities for children and parents.
4. To prevent the development of the carious process in children with some neuropsychiatric disorders, it is advisable to carry out deep fluoridation 2 times a year in a dental clinic and a two-week course of local application of remineralizing gel at home.

LIST OF ABBREVIATIONS

ABA-therapy - Applied Behavior Analysis

ASD – autism spectrum disorder

CGP – chronic generalized periodontitis

CP – cerebral palsy

CPI – complex periodontal index

DMFt – DMF index of teeth – the sum of carious (D), sealed (F) and removals (M) due to complications of caries teeth in one examined

Emergency – emergency situation

EOM – electrodontometry

ERT– enamel resistance test by V.R. Okushko

FBI – Federal Budgetary Institution

FD – Federal District

FEFD – Far Eastern Federal District

FEFU – Federal State Autonomous Educational Institution of Higher Education Far Eastern Federal University

FSBMEI HE – Federal State Budgetary Military Educational Institution of Higher Education

HI – hygiene index

HIA – limited health opportunities

Ig – immunoglobulin

IPD – inflammatory periodontal diseases

KGAUZ “Artemovskaya SP” – regional state autonomous healthcare institution
“Artemovskaya dental polyclinic”

KGBUZ “Regional children’s dental polyclinic” – regional state budgetary healthcare institution “Regional children’s dental polyclinic”

LP – lipid peroxidation

$M \pm m$ – the average value of the indicator and the average mistake

MMedA – Military Medical Academy named after S.M. Kirov

MOH – Ministry of Health

PP – periodontal pocket

PCOH – professional controlled oral hygiene

r – correlation

RF – Russian Federation

SBI – gingival sulcus bleeding index

VAK – Higher Attestation Commission

WHO – World Health Organization

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APPENDIX 1

Recommendations for the use of a set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders

The set of educational, therapeutic and preventive measures to prevent the development of oral diseases in children with certain mental health disorders consists of several modules:

The first module of events. Teaching oral hygiene to a child.

The objectives of the first module of events:

- teaching the child oral hygiene skills;
- development of “habituation” to the dental environment;
- reduction of the severity of stomatophobia in children.

Taking into account the peculiarities of information perception by children with neuropsychiatric disorders, a special training program has been developed, which includes a demonstration of a slide film with all stages of oral care (Figures 6-11), designed and filmed specifically for children with neuropsychiatric disorders. Standard dental cleaning techniques are demonstrated to children in a playful way, using a visual aid, and recommendations for oral care are given.

Also, to practice the skills of brushing teeth, a coloring book was developed, which was given to parents (Appendix 3).

Further, to consolidate the information received, children are invited to demonstrate what they saw on toys and dolls. After 2-3 classes, children are invited to conduct oral hygiene on their own.



Figure 1. A fragment of a training slide film on oral care, training in brushing teeth of the upper jaw on the right.



Figure 2. A fragment of a training slide film on oral care, training in brushing teeth of the upper jaw on the left.



Figure 3. A fragment of a training slide film on oral care, training in brushing the teeth of the lower jaw on the right.



Figure 4. A fragment of a training slide film on oral care, training in brushing the teeth of the lower jaw on the left.



Figure 5. A fragment of a training slide film on oral care, training in brushing the teeth of the vestibular surface on the right.



Figure 5. A fragment of a training slide film on oral care, training in brushing the teeth of the vestibular surface on the left.

Also, the first module of events of the complex provides for showing children photos of a 5-year-old child visiting a dentist (Figures 7-9). Photos are shown to children 2-3 times a week to reduce the feeling of fear before visiting a dentist.

During the events of the first module of the complex, parents should start daily brushing the child's teeth, if the child protests, they should not force him, but continue to demonstrate photos and conduct classes with him in a playful way. When a child agrees to brushing his teeth by his parents, after 7-10 days of successful brushing with parental comments on their actions, the child's parents should study with him and color the developed coloring book (Appendix 3), demonstrating the need for brushing teeth and visiting a dentist.



Figure 7. A child in a dental chair.



Figure 8. A pediatric dentist conducts an examination of the child's oral cavity.



Figure 9. A pediatric dentist performs an examination of the oral cavity using a dental mirror.

The second module of events. Oral hygiene training lessons for parents.

The events of the second module of the complex are held in parallel with the events of the first module.

The objectives of the second module activities:

- motivation of parents to observe oral hygiene in a child;
- teaching standard methods of brushing teeth to parents;
- informing parents about additional methods of prevention of oral diseases.

Before the training lessons, a survey of the child's parents is conducted in order to collect anamnesis. When collecting anamnesis, the hereditary burden of the anamnesis, the course of the mother's pregnancy, the bad habits of the parents are taken into account, the nature of the therapy of the underlying disease, medications, dosage, frequency of administration used to treat the underlying disease are specified. Attention is drawn to the child's nutrition. The doctor fills in the medical documentation.

This part of the set of measures is aimed at informing parents about the causes of dental caries and other diseases of the oral cavity, modern methods of prevention, taking into account the characteristics of children. The information module also includes a developed lecture course "Temporary and permanent bite: only facts" (Appendix 2).

The third module. Acquaintance with the dentist.

The objectives of the third module of events:

- adaptation of the child to the situation in the dental office;
- familiarization of the child with the basic tools used in the examination of the oral cavity and the conduct of professional oral hygiene;
- assessment by the doctor of the psychoemotional state of the child;
- assessment by the doctor of the child's oral care skills.

To do this, the child's behavior is assessed in a playful way using the developed Scale for assessing the child's behavioral reactions, then the patient's oral cavity is examined with a preliminary demonstration of dental instruments and controlled brushing of teeth by the child in the dental office in the presence of parents.

The fourth module. Carrying out therapeutic and preventive measures.

The objective of the fourth module of measures is the prevention of dental caries and periodontal diseases in children, according to indications – the treatment of dental diseases.

The fourth module of the complex activities includes:

- carrying out professional oral hygiene using rubber caps (or end brushes) and paste, according to indications, ultrasonic equipment is also used to remove hard dental deposits;

- the use of the medication for deep fluoridation “Gluftored” according to the following scheme: after brushing and drying the teeth, the teeth are carefully treated with liquid from bottle 1, in one minute the excess material is removed with a dry cotton swab, the enamel of the teeth is treated with liquid number 2, the procedure is repeated after 14 days, and then every 6 months;

- the use of “Biorepair” toothpaste in all study groups except the 5th (control): toothpaste is prescribed for use in the morning and evening;

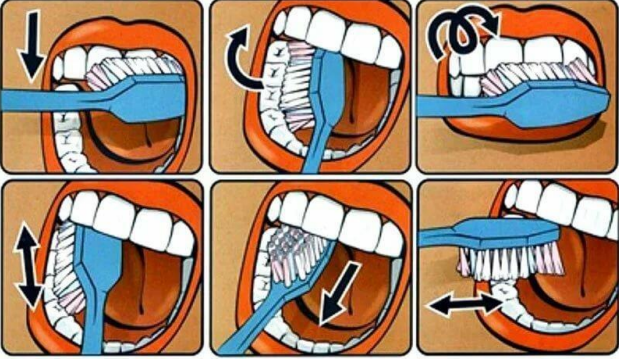
- the appointment of the medication “Imudon” according to the instructions: dissolve 6 tablets a day for 10 days;

- appointment by a pediatrician the medication “Lactobacterin” inside under the supervision of parents and / or guardians (representatives): 3 times a day for 30-40 minutes before meals, washed down with milk, a course for 3 weeks;

- applications of “R.O.C.S. Minerals” gel 1 time a day at night for a course of 14 days with an interval between procedures of six months;

- treatment and / or removal of teeth according to indications.

Memo for parents “Rules of oral care”

	<p>Before starting the dental cleaning procedure, practice rinsing the mouth and spitting water together with your child. To do this, you can use boiled water at room temperature.</p>
2.	Brushing teeth 2 times a day (morning and evening).
3.	Brush your teeth for at least 60 seconds.
4.	<p>The remains of the toothpaste are thoroughly rinsed with water and spit out. Attention! The rinsing process must be controlled by adults.</p>
5.	After brushing your teeth, thoroughly rinse the toothbrush from the remnants of toothpaste.
6.	<p>Dental cleaning technique:</p> 
7.	<p>Choosing a toothpaste and a toothbrush for the child:</p> <ol style="list-style-type: none"> 1. A toothbrush for children 0-10 years old – with soft bristles, for children 11-17 years old – with medium-hard bristles. 2. Change the toothbrush every 2-3 months. 3. Choose toothpaste strictly taking into account the manufacturer’s recommendations by age. <p>Attention! Do NOT use a toothbrush with stiff bristles in children of any age.</p>
8.	As an additional oral care, it is possible (provided that the child has learned to spit!) to use rinses according to the age of the child.
Be healthy!	

APPENDIX 2

Lecture material for parents on the topic: “Temporary and permanent bite: only facts”.

Dear parents! It should be remembered that a child is not an adult in miniature. In children, all organs and systems under the age of 18 continue to develop. Despite the high-tech age, many parents are experiencing a shortage of truthful information about ways to preserve the health of the child. The most common myths about temporary and permanent teeth will be presented to your attention today and answers will be given to them. Let's start with a temporary bite.

Myth 1. Temporary teeth do not hurt.

Teeth of temporary and permanent bite have differences in shape, color, however, the internal structure of temporary teeth is no different from permanent ones: a neurovascular bundle is present in teeth of temporary bite, that is why children's teeth also hurt.



Myth 2. It is not necessary to treat temporary bite teeth, they will change anyway.

Of course, it is necessary to treat temporary bite teeth. There are a number of indications for the removal of temporary teeth before the physiological shift. If a child “loses” teeth before the beginning of the bite change, problems may arise with the

formation of the facial skull and physiological bite, which can cause oral breathing in a child and lead to diseases of the upper respiratory tract.

Myth 3. The sooner temporary teeth are removed, the faster permanent teeth will erupt.

“Everything is in good time”, and the teeth of a permanent bite are in their infancy in the bones of the upper and lower jaws. To complete the formation and the beginning of their eruption, time is needed, which does not depend on early removal, moreover, the full maturation of the enamel occurs within two years after the eruption of a permanent tooth.

Myth 4. Temporary teeth do not have to be cleaned.

Be sure to clean, as well as adults, twice a day with a paste selected by age. The mouth is the beginning of the digestive tract, during the day food residues accumulate, on which bacteria grow and develop. This can cause not only tooth decay, but also cause inflammatory diseases of the gum tissue and oral mucosa.

Myth 5. All teeth of the temporary bite have a shift.

There are 20 teeth in a temporary bite, and 28 in a permanent bite (not counting the “wisdom teeth”), which means that 8 teeth of a permanent bite have no “predecessors”. At the age of 6-7 years, the first permanent molar begins to erupt behind the last molar of the temporary bite, it does not have a “predecessor”. There is no group of teeth in a temporary bite, which is called premolars in a permanent bite, that is why there is a difference in the number of teeth of a temporary and permanent bite.

Now let us talk about permanent bite.

Myth 1. The more often you brush your teeth, the healthier they will be.

It is necessary to brush your teeth twice a day. And this is not a whim of dentists, but a scientifically proven frequency of brushing teeth, which helps to keep teeth healthy, preventing bacteria from fixing to the teeth and causing caries. When brushing teeth more often than 2 times a day, hypersensitivity of the teeth may occur, manifested by short-term pain from cold, sweet, sour food.

Myth 2. To better clean your teeth, you need to use a toothbrush with “rough” bristles.

The dentist recommends toothpaste and a brush, according to your individual characteristics. However, if you do not overuse tobacco, strong drinks like coffee, then there is no need for a brush with “rough” bristles. In addition, the frequent use of such brushes in combination with the wrong method of brushing teeth can lead to the disease “wedge-shaped defect”. For children and adults, a medium-hard toothbrush is usually recommended.



Figure 1. Teeth with wedge-shaped defects.

Myth 3. “Wisdom teeth” must be removed.

No, it is not necessary at all. Only a dentist can tell you about the need to remove “wisdom teeth”, and if the teeth are healthy and do not change the dental arch when they erupt, then they are not removed.

Myth 4. After eating, you need to use a toothpick.

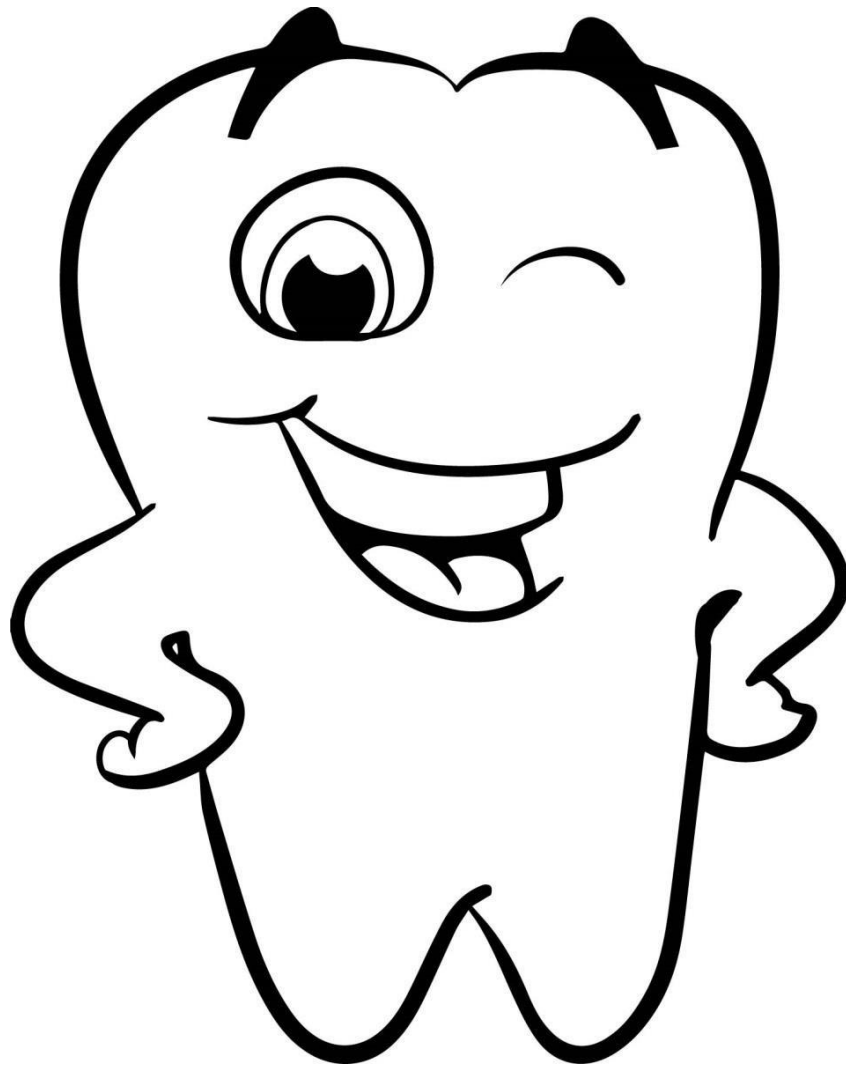
Of course, food that gets stuck in the interdental spaces causes discomfort and can cause dental caries or inflammatory gum diseases. However, the sharp end of toothpicks can injure the gum and cause it to bleed. It is safer to use dental floss.

Myth 5. There is no escape from genetics: dental caries is inherited and there is no point in spending money and time to preserve dental health.

Of course, the genetic component in the occurrence of dental caries cannot be excluded. But by following the simple rules of personal hygiene and oral care, even in the presence of unfavorable heredity, you can keep your teeth and your child's teeth healthy.

Coloring book for classes with children.

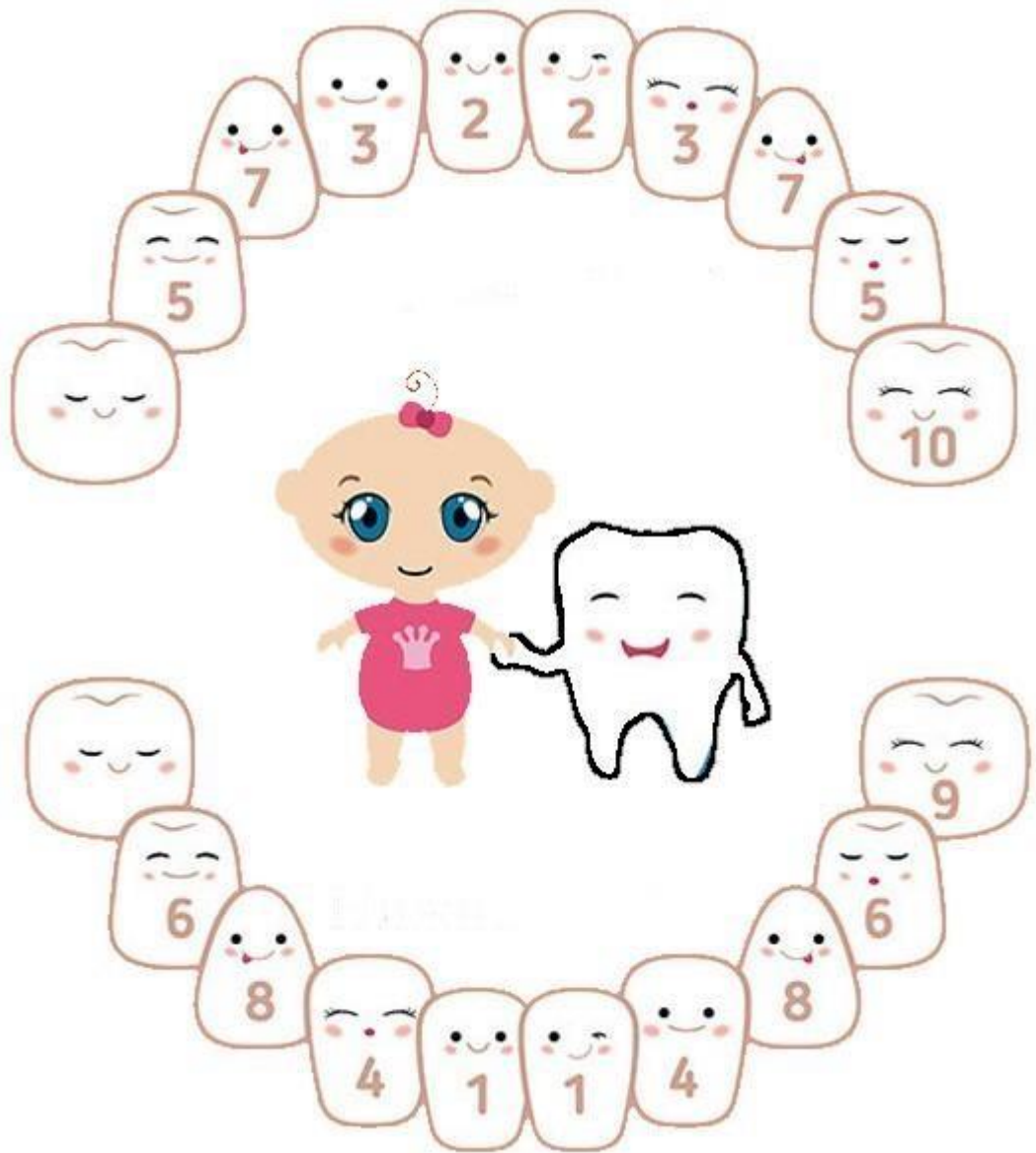
hi!



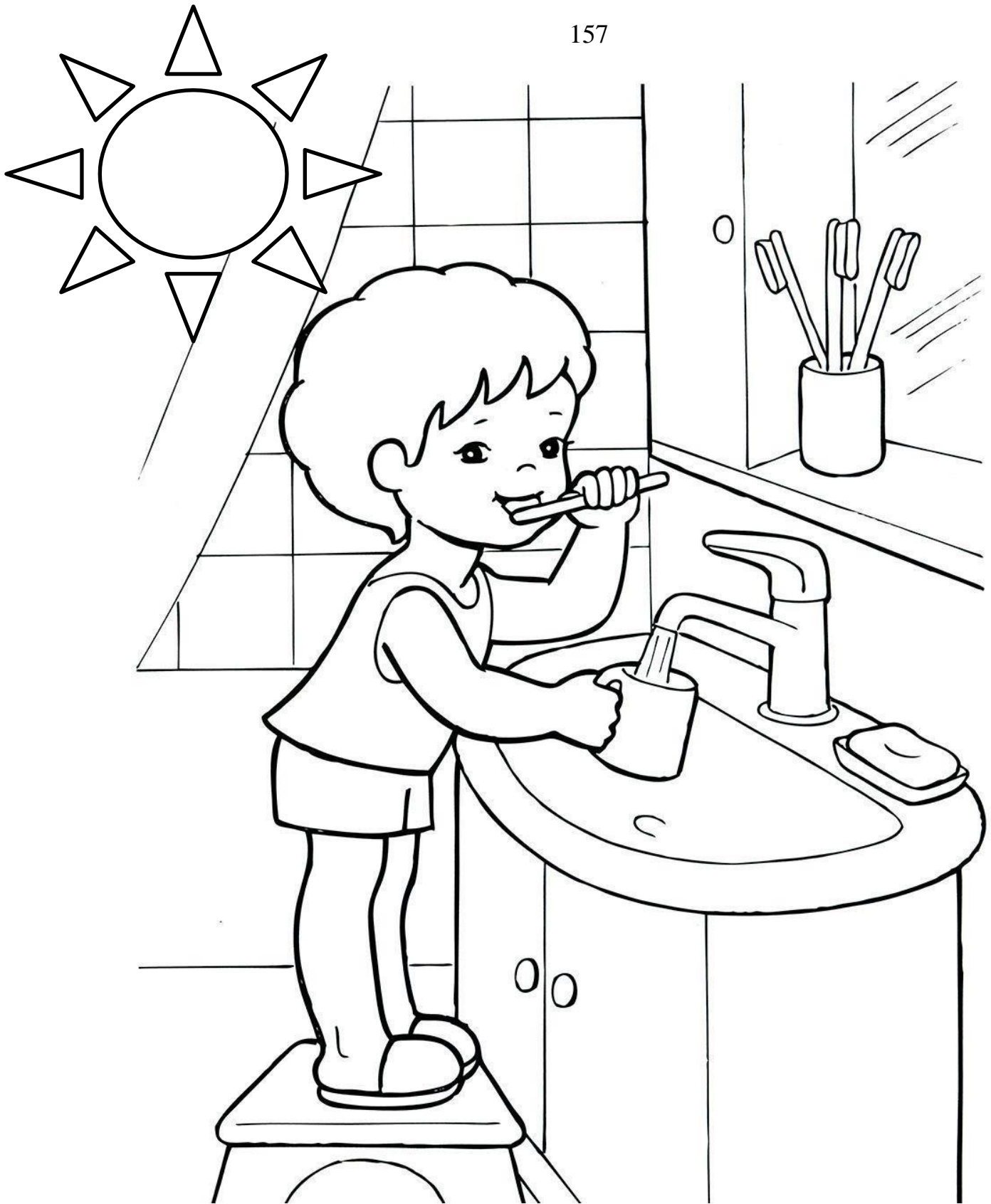
Dear friend! Let's get acquainted! My name is Kid the tooth. What's your name?



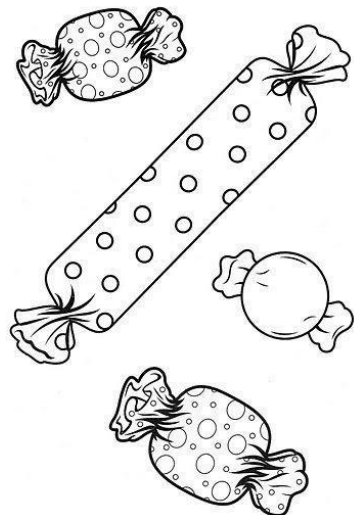
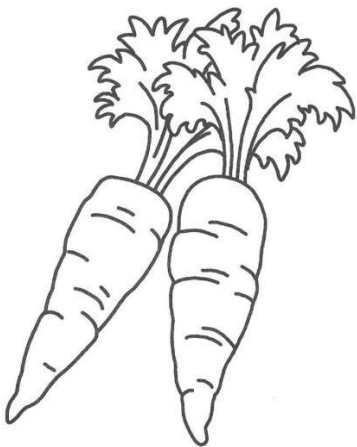
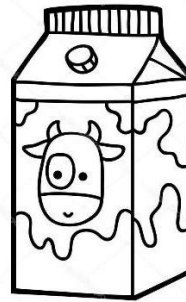
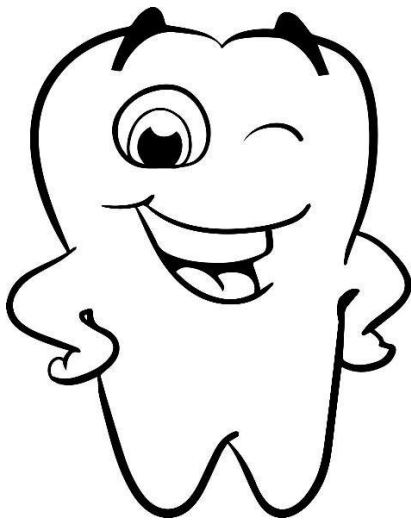
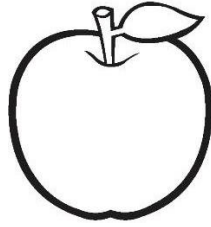
Meet my friends Toothpaste and Toothbrush! We have been friends with them since childhood. And every morning and every evening we play with them.



I have a big and friendly family. I have a mom, a dad, grandparents and 15 brothers and sisters. We all live together in the same house.

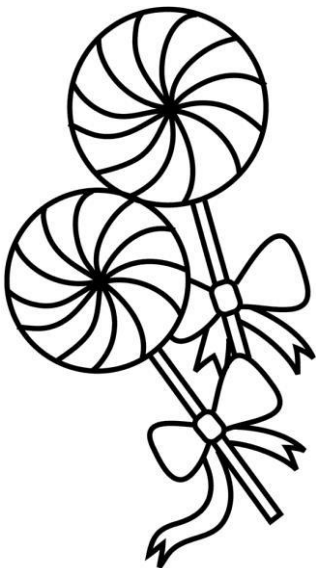
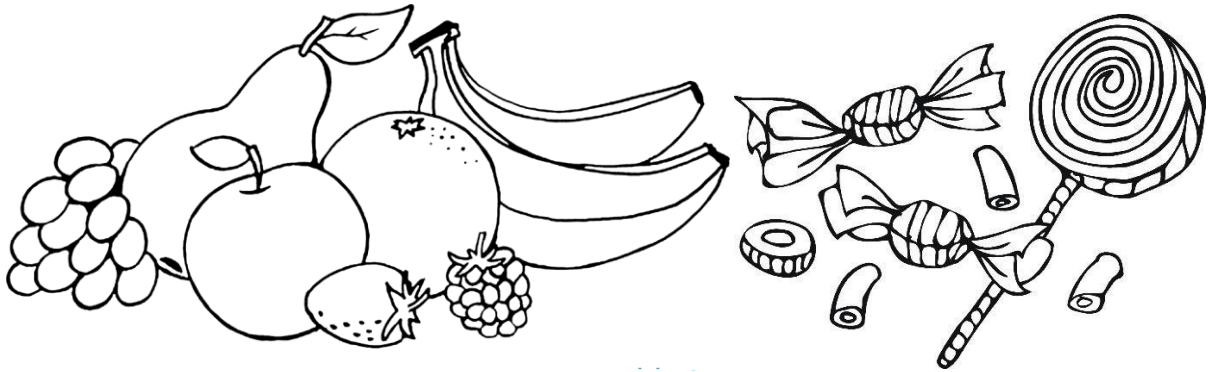


Every morning, after sleeping, the whole family washes.
Then we go to breakfast.



Help us choose the food that will make us grow up healthy and strong.

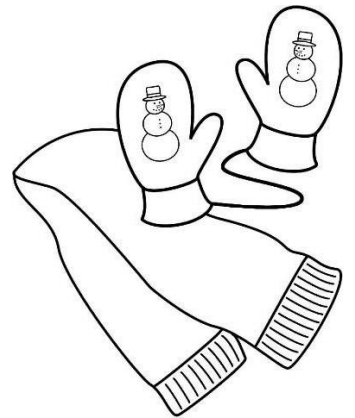
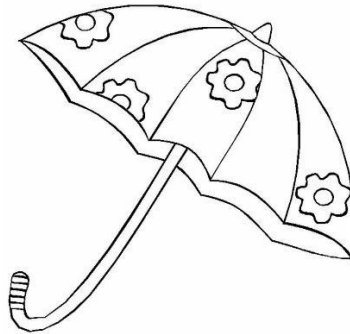
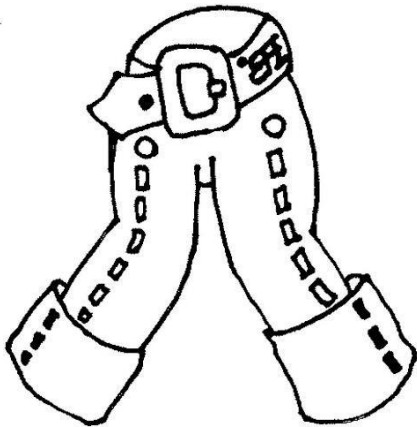
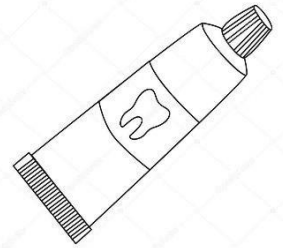
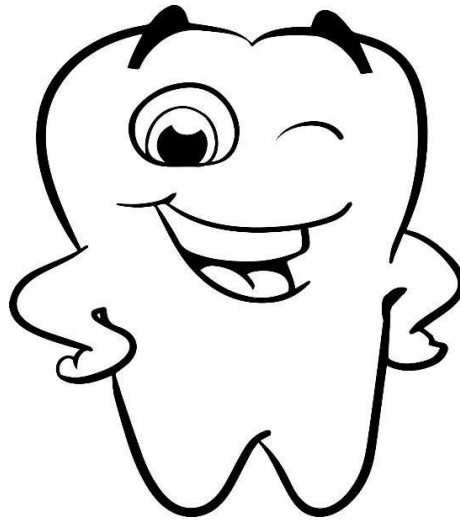
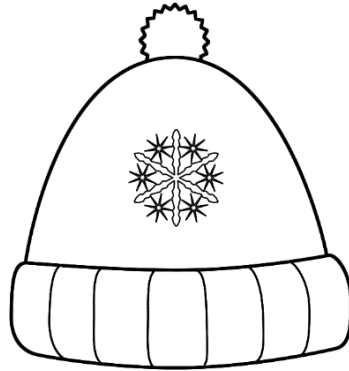
And what kind of food do you think we, Teeth, will get sick from?



We are very afraid of getting sick. Our disease is called Caries.



We always wash before going to bed, and a Toothbrush and Toothpaste help us.



Friend, I need your help. Help me find something that will protect me and the rest of teeth from Caries.

But, you know, sometimes Caries turns out to be very strong and insidious ... then only a dentist can help us, the Teeth.



So that Caries can never catch us by surprise, we go to the dentist for an examination every 6 months.

The doctor always examines us carefully. To do this, each doctor has special tools.



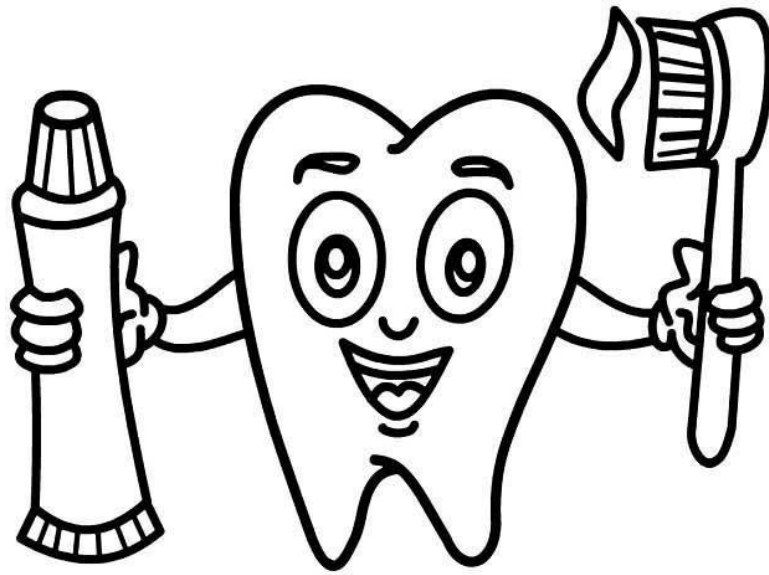
But, if the Caries managed to infect someone from my family, then the dentist will always be able to “drive away” the Caries and cure the Teeth.

To do this, the dentist uses a special “toothbrush” and medications to cure Caries.



A dentist will always help you defeat Caries the Villain!

Toothbrush, Toothpaste, Dentist



A great team in the fight against Caries the Villain!

APPENDIX 4

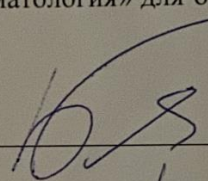
УТВЕРЖДАЮ
Директор Школы Биомедицины
Ю.С.Хотимченко
2018



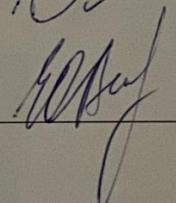
Акт о внедрении

1. Наименование положения: Клиническое обоснование комплекса профилактики стоматологических заболеваний у детей с нарушением психического здоровья.
2. Автор предложения: соискатель Военно-Медицинской Академии им. С.М. Кирова, кафедра терапевтической стоматологии, Алексеева Екатерина Олеговна.
3. Форма внедрения: результаты диссертационной работы включены в учебную программу дисциплины «Стоматология» для обучающихся по специальности 31.05.01 «Лечебное дело».

Директор Департамента
клинической медицины _____

 Б.И.Гельцер

Соискатель Военно-Медицинской
Академии им. С.М. Кирова,
кафедра терапевтической стоматологии _____

 Е.О.Алексеева

APPENDIX 5

УТВЕРЖДАЮ
 Главный врач КГАУЗ «Артемовская
 стоматологическая поликлиника»
 Шарафутдинова М.В.
 2018 г.

Акт о внедрении

1. Наименование предложения: Комплекс мероприятий «Здоровые улыбки особенных детей» для подготовки детей с нарушением психического здоровья к посещению врача-стоматолога, а также оказания им стоматологической помощи.
2. Автор предложения: соискатель Военно-Медицинской Академии им. С.М. Кирова, кафедра терапевтической стоматологии, тема диссертации: «Клиническое обоснование комплекса профилактики стоматологических заболеваний у детей с нарушениями психического здоровья»
3. Наименование учреждения, внедрившего разработку и дата внедрения: краевое государственное автономное учреждение здравоохранения «Артемовская стоматологическая поликлиника», октябрь, 2018 г.
4. Форма внедрения: внедрение в организацию работы детского отделения.
5. Основные результаты внедрения и их практическая значимость: предложение авторское, имеет важное практическое значение, так как в результате внедрения комплекса удалось повысить мотивацию к стоматологическому лечению, улучшить показатели гигиены полости рта, снизить распространенность заболеваний тканей пародонта, определить спектр профилактических мер, что способствовало оптимизации лечебного процесса и улучшению реабилитации детей с психоневрологическими заболеваниями.

Главный врач КГАУЗ «Артемовская СП»

М.В.Шарафутдинова

Соискатель Военно-Медицинской
 Академии им. С.М. Кирова,
 кафедра терапевтической стоматологии

Е.О.Алексеева