Nanotechnology Perceptions
ISSN 1660-6795
www.nano-ntp.com

Comparative Analysis of the Effectiveness of Sealing Dental Fissures in the Prevention of Caries of Permanent Teeth in Children with Mental Retardation

Yakubova Sarvinoz Rakhmonkulovna[1], Indiaminova Gavkhar Nuriddinovna[1], Xasanova Gulbakhor Rakhmatullayevna[2]

[1]Doctor of Philosophy medical sciences (PhD), Samarkand State Medical University, Samarkand, Uzbekistan
[2]Samarkand State Medical University

Objective: to improve methods of early diagnosis, treatment and prevention of caries of permanent teeth in mentally retarded children attending special schools.
Methods: During the study, general clinical, laboratory, biochemical, functional, instrumental and statistical methods were used. The object of the study was 220 pupils attending special boarding schools No. 62 and 63 of Samarkand city and Akdarya district, respectively, from 2018 to 2021.
Results: The prevalence of dental caries in mentally retarded children studying in specialized schools depends on their level of socialization, nutrition and the presence of Down syndrome. The risk group includes socialized children without Down syndrome: the caries intensity index was 3.8 4.9; 5.8, and the prevalence is 42.0, 76.0 and 85.0% in children 8, 10 and 12 years old, respectively. The prevalence of caries in children with Down syndrome was lower - 33.0, 64.0 and 72.0% in children 8, 10 and 12 years old, respectively.
Conclusions: According to the results of applying a special preventive algorithm, the number of cariogenic microorganisms on the teeth slightly decreased from the initial values. Thus, the most optimal treatment regimen with a high therapeutic effect in mentally retarded patients has been identified, which makes it possible to increase the effectiveness of treatment and reduce its time.
Keywords: dental caries, periodontal disease, epidemiological study, caries intensity, mental retardation.

1. Introduction

In the dental practice of the world, there is a high frequency of various orthopedic and orthodontic defects, including forms manifested in the form of various degrees of adentia. The prevalence of adentia has increased significantly and according to the data is 35.4-62.9% [1]. It is proved that in modern society, oral diseases have a humanitarian, socio–economic significance. Today, caries and periodontal diseases remain the most common dental disease not only among adults, but also among younger segments of the world's population. According to recent epidemiological studies conducted on healthy children, the incidence of dental pathology is high, and the prevalence of caries among healthy age groups of 12-15 years is 63.3–83 years, 4% and 81.7-88.7%, the intensity is 3.02-3.75 and 4.6-5.73, and the prevalence of periodontal tissue diseases in the group of healthy 12-year-olds fluctuated from 37.8% to 50%, in the 15-year-old group of children it ranged from 57.7% to 84.7%. The prevalence of caries is also high in children with mental retardation of preschool and school age, while the intensity of caries is higher in children aged 13-18 years with mild mental retardation. These indicators increase with age and depend on the severity of the underlying disease. According to WHO, about 15% of the world's population consists of people with disabilities. This corresponds to 650 million people, of which 200 million are children. The prevalence of mental retardation in the population ranges from 1% to 3%. Dental care for mentally retarded children is associated with a number of difficulties due to their lack of contact due to the underlying disease (mental disorders and behavioral disorders, diseases of the nervous system) and requires treatment of this group of children under general anesthesia, which is not always possible due to the presence of concomitant severe somatic pathology. In addition, not all institutions of this type have dental offices. All this dictates the need to find new forms of dental care for mentally retarded children, one of the important components of which should be prevention. We have implemented a program for the prevention of dental diseases in children with disabilities, however, most of them were aimed at children with mild and moderate mental retardation, which took into account not only the degree of mental retardation, but also the teaching of oral care skills, the degree of socialization and the child's diet.

2. The purpose of the study:

To improve the methods of prevention of caries of permanent teeth in children with mental disabilities based on the development of a "special IT program" and to evaluate the effectiveness and efficiency of ozone therapy in the prevention of dental caries. Research materials and methods. 220 patients with mental disabilities from specialized boarding schools No. 62 in Samarkand and No. 63 in Akdarin district were examined, including between 6, 9 and 12-year-olds from boarding schools. Depending on age, gender, diet, type of major neurological diseases, the presence of Down syndrome and the degree of socialization of children, the hygienic condition of the oral cavity was studied with the use of a special program aimed at preventing caries of permanent teeth for a certain period of time, the level of their effectiveness is determined. General clinical, instrumental, functional and statistical methods were used to solve the tasks. The following indicators were evaluated: -the prevalence of caries; the intensity of caries of permanent teeth according to the CPI index; the clinical

condition of periodontal tissues was assessed according to the PMA index in the Parma modification. To assess the risk of dental diseases, a microbiological study of plaque was conducted, for which children from subgroup 1 in the number of 26 people and from subgroup 2 – 24 people were randomly selected. To conduct a microbiological study, dental plaque was collected by scraping with a sterile excavator. The prevention program included teaching children oral hygiene and health education with the staff of the institution and the parents of some of the pupils who attended the boarding school. Individual methods of prevention were also carried out: Professional oral hygiene (Figure 1); Remineralizing therapy- applying fluoride-containing varnish to teeth; Sealing the fissures of permanent teeth using ozone (Figure 2).

Figure 1. Professional oral hygiene, dental fluoridation.

Recently, due to the increasing allergization of the population, sensitivity to antibiotics is decreasing, the cost of medicines is rising, and non-medicinal methods of treatment are becoming more popular. Among them is ozone therapy, which is deservedly becoming more widespread all over the world. This is due to the properties of ozone to influence the transport and release of oxygen into tissues, its disinfecting effect. Ozone is used in therapy, surgery, obstetrics and gynecology, dermatology, dentistry and cosmetology.

Figure 2. Sealing the fissures of permanent teeth in a 12-year-old child after treatment with ozonated water

3. Results:

It was found that children with Down syndrome are less at risk of developing dental caries, therefore, a division was carried out within subgroups with different socialization, taking into account the presence of this syndrome. Thus, within the subgroups of 6, 12 and 15-year-old socialized children, children without Down syndrome were identified —10, 32 and 40 children, respectively, and children suffering from this syndrome —12, 8 and 5 children, respectively. Among 6, 12 and 15-year—old non-socialized children, subgroups of children without Down syndrome were also identified - 11, 30 and 15 children, respectively, and children with Down syndrome — 4, 6 and 13 children, respectively. The prevalence and intensity of caries were assessed in these subgroups. To assess the risk of dental diseases, a microbiological study of plaque was conducted, for which children from subgroup 1 in the number of 23 people and from subgroup 2 – 21 people were randomly selected. To conduct a microbiological study, dental plaque above the gingival was collected by scraping with a sterile excavator. Evaluating the data we have obtained, it can be noted that representatives of the genus streptococcus were most often isolated from plaque. In subgroup 1, streptococci were isolated in 25.8%, and in subgroup 2 in 34.0% of the total number of microorganisms detected. Among streptococci in subgroup 1, S. oralis -12.9% and S. gordonii – 3.53% dominated, S. cristatus, S. sinensis, S. mitis, S. sanguinis, S. rheimopia were found in a lower percentage (1,2%; 1,2%, 1,2%, 2,4%, 1,2%, accordingly). S. australis was also isolated in subgroup 2, but in greater numbers than in subgroup 1 and amounted to 14.2%. In smaller numbers, S. gordonii -4.4%, S. sinensis – 5.5%, S. mitis – 5.5% were isolated. S. were found only once. cristatus (1.1%), as well as S. constellatus (1.1%), S. agalactiae (1.1%), S. anginosus (1.1%), which were not found in subgroup 1. In addition to streptococci, other types of microorganisms were isolated from plaque, including a significant percentage of the total number of isolated strains they made up staphylococci. They were isolated in children of the 1st subgroup in 9.9% of cases, and in this subgroup St. aureus prevailed- 5.9%, for the share of S. epidermidis accounted for 3.5%. In the 2nd subgroup, we noted staphylococci in 6.6% of cases, and a larger percentage, unlike children of subgroup 1, occurred in S. epidermidis - 5,5%. The high percentage of Candida fungi excretion from plaque is noteworthy, and in children of subgroup 1 they were noted four times more often than in children of subgroup 2 and amounted to 17.6% and 4.4%, respectively. Candida albicans dominated among fungi of the genus Candida and the frequency of its isolation was in subgroup 1 -12.9% and 3.3% in subgroup 2 of the total number isolated by the strain. Actinomycetes were also isolated as part of the microflora of plaque in a significant percentage of cases. In children of subgroup 1, in 10.6% of cases, in subgroup 2, this type of microorganisms was more common, and amounted to 14.3%. Neisseries were found in subgroup 1 twice less often than in children of subgroup 2 and their percentage was 8.2 and 15.4, respectively. We also found fusobacteria in the plaque. In children of subgroup 1, 5.9%, in subgroup 2, this type of microorganisms was more common, and amounted to 7.7%. Only in children of subgroup 1, we isolated Acinetobacter lwoffii, which was found in a significant number of cases - 14.1%. We isolated a small amount of Capnocytophaga in plaque in children of the 2nd subgroup (3.3%). Other types were found in 8.2% of children of subgroup 1 and in 14.3% of children of subgroup 2. The third stage of our research was the development, implementation and evaluation of the effectiveness of a dental caries prevention program adapted for mentally retarded children in a specialized school. The prevention program included teaching children oral hygiene and health education

with the staff of the institution and the parents of some of the pupils who attended the boarding school. Individual prevention methods were also carried out: professional hygiene, applying fluoride-containing varnish to teeth, sealing fissures using ozone. The effectiveness of the implemented adapted prevention program, which takes into account the medical, psychological and pedagogical characteristics of children, was evaluated according to the hygiene index (GAMES -Y) and the condition of periodontal tissues (PMA index) initially, 1,2,3 years after the start of training. Conclusion: the data obtained from 9 and 12-year-olds, before the introduction of the program, served as internal control for groups of children who entered the prevention program at the ages of 6-8 and 9-11 years. At the same time, the group of 9-year-olds is a comparison group for the other groups of 9-year-olds and becomes the main one three years after these children reach the age of 12. For children who joined the prevention program at the age of 12, 15-year-olds, previously examined children served as a control group. The prevalence and intensity of dental caries in mentally retarded children depended on socialization, which determines lifestyle and diet, as well as on the presence of Down syndrome. The incidence of dental caries in mentally retarded children living in boarding schools depends on their socialization, which determines some features of lifestyle and nutrition. The risk group consists of socialized children without Down syndrome: the prevalence of caries was 31.0, 62.0 and 83.0% with intensity 0[0;1,17], 2[0;4], 4[3;5] in 6, 12, and 15-year-old children, respectively. In non–socialized children without Down syndrome, the prevalence of caries was low - 0, 18.0 and 22.5% in 6, 12 and 15-year-olds, respectively, and children with Down syndrome had no dental caries. In socialized children, mild gingivitis prevailed (55, 50 and 50% among 6, 12 and 15-year-olds, respectively), in non-socialized children, moderate gingivitis (47.1 and 41.6% in 6 and 15-year-olds, respectively) and severe gingivitis (38.6% in 12-year-olds). 45[26;67,5]. The inability to take full-fledged mouth care on their own makes this group of children particularly vulnerable to periodontal diseases. The prevalence of dental caries in mentally retarded children enrolled in specialized schools depends on their level of socialization, nutrition and the presence of Down syndrome. The risk group includes socialized children without Down syndrome: the caries intensity index was 3.8, 4.9; 5.8, and the prevalence was 42.0, 76.0 and 85.0% in children aged 8, 10 and 12, respectively. The prevalence of caries in children with Down syndrome was lower - 33.0, 64.0 and 72.0% in children aged 8, 10 and 12 years, respectively. As a result of microbiological examination of teeth, noticeable negative changes in the composition of the microflora of the teeth of children without Down syndrome, relatively socialized mentally retarded, including an increase in species of the genus Streptococcus, considered cariesogenic, indicates a high potential of the carious process.

4. Conclusion

1. The prevalence of dental caries in mentally retarded children enrolled in specialized schools depends on their level of socialization, nutrition and the presence of Down syndrome. The risk group includes socialized children without Down syndrome: the caries intensity index was 3.8, 4.9; 5.8, and the prevalence was 42.0, 76.0 and 85.0% in children aged 8, 10 and 12, respectively. The prevalence of caries in children with Down syndrome was lower - 33.0, 64.0 and 72.0% in children aged 8, 10 and 12 years, respectively. 2. As a result of microbiological examination of teeth, noticeable negative changes in the composition of the microflora of the

teeth of children without Down syndrome, relatively socialized mentally retarded, including an increase in species of the genus Streptococcus, considered cariesogenic, indicates a high potential of the carious process. 3. During the two years of the implementation of the preventive program, a positive increase in hygiene indicators was noted. Satisfactory hygienic condition was observed in 64.2%, good hygienic condition in 35.2%, unsatisfactory hygienic condition in 0.6% of children. 4. The use of ozone as part of the comprehensive prevention of caries in children with mental retardation, taking into account their mental and physical abilities, has yielded positive results. There were no negative complications when performing complex measures with ozone oxygen in children, the use of this method continued to be comfortable and painless for patients.

References

1. Rizaev Z. A., Abdunosirovich R. R., Sharipovna N. N. Ways to improve the organization of dental services for chemical industry workers //The American journal of medical sciences and pharmaceutical research. – 2020. – Т. 2. – №. 12. – С. 35-39.
2. Rizayev, J.A., Nazarova, N.Sh., & Kubayev, A.S. (2020). Features of the course of oral cavity diseases in workers of fiberglass construction production. Vestnik nauki i obrazovaniya, 21-1 (99), 79-82. (in Russian)
3. Rizayev, J., Shomurodov, K., & Agzamova, S. (2020). Medical rehabilitation of patients with zygomatic-orbital complex fractures. Journal of Stomatology and Craniofacial Research, × 1 ×(2), 8-11. (in Russian)
4. Rizayev, E., & Bekjanova, O. (2019). Modern approaches to the organization of periodontal disease treatment. Stomatologiya, × 1 ×(3), 70-76. (in Russian)
5. Rizayev, J.A., & Tuksonboyev, N.Kh.U. (2021). Nasal deformity with cleft and rhinoplasty. Scientific progress, × 2 ×(2), 92-104. (in Russian)\
6. Indiaminova, G., & Zoirov, T. (2020). Optimization of dental care for children with intellectual disabilities in specialized schools. Journal of Stomatology and Craniofacial Research, × 1 ×(1), 12-14. (in Uzbek)
7. Indiaminova, G.N., & Zoirov, T.E. (2020). Optimization of dental care provision for pupils of specialized schools for children with intellectual disabilities. Vestnik nauki i obrazovaniya, 24-2 (102), 39-43. (in Russian)
8. Indiaminova, G.N., & Arzikulova, M.Sh. (2021). Improvement of methods for providing dental care for children with developmental delay. Journal of Biomedicine and Practice, × 6 ×(1). (in Russian)
9. Indiaminova, G., & Utkurovna, U.Y. (2022). Improving the methods of preventing caries in the fissure area of permanent teeth in children. Journal of New Century Innovations, × 18 ×(4), 16-18.\
10. Indiaminova, I.G., & Utkurovna, U.Y. (2022). Improving methods to prevent caries of the permanent tooth fissure area in children. ACADEMICIA: An International Multidisciplinary Research Journal, × 12 ×(5), 436-439.
11. Indiaminova, G.N., & Yakubova, S.R. (2022). Application of local individual methods for caries prevention of permanent teeth in children with intellectual disabilities. Journal of Biomedicine and Practice, × 7 ×(6). (in Russian)
12. Indiaminova, G.N. (2022). Development of special IT programs for providing dental care to pupils of special boarding schools for children with intellectual disabilities and assessment of its effectiveness. Journal of Biomedicine and Practice, × 7 ×(6). (in Uzbek)
13. Indiaminova, G., & Zoirov, T. (2020). Optimization of dental care for children with intellectual disabilities in specialized schools. Journal of Stomatology and Craniofacial Research, × 1 ×(1), 12-14. (in Uzbek)