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STUDY OF THE STATE OF THE HARD TISSUES OF THE TEETH IN CHILDREN AND IN CHILDREN WITH SENSORY DEPRIVATION OF VISION

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The study was devoted to studying the state of hard tissues of temporary and permanent teeth in children with sensory deprivation of vision. 116 blind children of different ages took part in the research. Children were divided by age into two groups – 6–8 years old (61 children) and 11–14 years old (56 children). All children underwent a comprehensive examination of the main disease and dental status according to a single scheme. The dental examination was carried out in a dental office. As a result of the conducted research, it was established that the obtained data are proof of the increased intensity of caries in children with blindness. These data are the basis for the development and implementation of a medical and preventive complex aimed at helping the children of this contingent.

Key words: hard tissues of teeth, oral health, pathology of vision, blindness, children.

С.В. Шпак, О.В. Дєньга, С.А. Шнайдер, В.М. Почтар, А. Єнча, М.І. Балєга, Н.А. Желізняк ВИВЧЕННЯ СТАНУ ТВЕРДИХ ТКАНИН ЗУБІВ У ДІТЕЙ З СЕНСОРНОЮ ДЕПРИВАЦІЄЮ ЗОРУ

Дослідження було присвячено вивченню стану твердих тканин тимчасових та постійних зубів у дітей з сенсорною депривацією зору. У дослідженнях брали участь 116 дітей різного віку. Діти були поділені за віком на дві групи – 6–8 років (61 дитина) та 11–14 років (56 дітей). Усі діти проходили комплексне обстеження основного захворювання та стоматологічного статусу за єдиною схемою. Стоматологічний огляд було проведено в умовах стоматологічного кабінету. В результаті проведених досліджень було встановлено, що отримані дані є доказом підвищеної інтенсивності карієсу у дітей з сліпотою. Ці дані є підґрунтям для розробки і впровадження лікувально-профілактичного комплексу спрямованого на допомогу дітям даного контингенту.

Ключові слова: тверді тканини зубів, здоров'я порожнини рота, патологія зору, сліпота, діти.

The study is a fragment of the research project “Improvement of diagnostics, prevention and treatment of teeth hard tissues mineralization processes violations in children”, state registration No. 0121U114421.

The prevalence of dental pathology among children remains one of the most acute and pressing problems of modern medical science and poses a real threat to the overall health status of the younger generation in Ukraine.

Against the backdrop of the overall high prevalence of dental diseases, there are groups of children whose indicators significantly exceed the average level. This group includes children with blindness. The peculiarity of dental pathology in this category of patients is the high prevalence and intensity of pathology of the dental-maxillary apparatus, as well as the simultaneous development of several independent types of pathology: dental caries, inflammatory periodontal diseases, dental anomalies, deformations, etc. [1, 11, 13].

Blind children are considered to be disabled. According to WHO data, disabled people make up one-tenth of the world's population [6]. It is known that the frequency of childhood disability in developed countries is 250 cases per 10,000 children and has a clear tendency to increase. According to the American UNICEF fund, every twentieth child today has some kind of disability. In other words, there are currently about 93 million children with disabilities in the world.

The problem of childhood disability is extremely urgent worldwide, including in our country. It has been found that the number of children with disabilities in Ukraine has significantly increased during the period from 2009 to 2018 [4].

All of this data confirms that the problem is relevant and under-studied. Further research on this issue will help to thoroughly evaluate the real state of the oral cavity in children with blindness.

The purpose of the study was to investigate the state of the hard tissues of primary and permanent teeth in children with sensory deprivation of vision.

Materials and methods. To achieve the research objective, 116 children with sensory deprivation of vision aged between 6 and 14 years from the municipal institution 'Odessa Special School No. 93' were surveyed. They were divided into two age groups. The first group consisted of 61 individuals aged 6–8 years old. The second group included 56 individuals aged 11–14 years old.

All patients underwent a comprehensive examination of their main disease and dental status using a unified scheme.

The intensity of caries in temporary teeth was determined by the decayed, filled teeth (dft) and decayed, filled surfaces (dfs) indices, while in permanent teeth, it was determined by the decayed, missing, filled teeth (DMFT) and decayed, missing, filled surfaces (DMFS) indices [2].

All children and their parents were informed about the nature of the clinical study, and only after signing an informed consent form was the child finally enrolled in the study. Dental examination was conducted in the dental office at the clinical base of the department of pediatric dentistry of Odesa national medical university (Department of pediatric dental health of the multidisciplinary medical center of ONMedU) and the Department of Epidemiology and Prevention of Major Dental Diseases, Pediatric Dentistry and Orthodontics of the SE "The Institute of stomatology and maxilla-facial surgery National academy of medical sciences of Ukraine" (SE «ISMFS NAMS») and the municipal institution "Odessa Special School No. 93".

The results were processed by variational statistical methods of analysis using the Microsoft Office Excel 2016 software. Statistical processing of the experimental study results was carried out by the methods of variation analysis using the Student's test. The difference was considered statistically significant at $p < 0.01$ [3].

Results of the study and their discussion. To effectively plan preventive measures for children with sensory deprivation of vision, it was essential to gain a deeper understanding of their oral health. Therefore, a study was conducted to evaluate the condition of hard tissues of both temporary and permanent teeth in this group of individuals. The aim was to compare their dental health indicators to the average indicators of tooth intensity in children in Ukraine.

Table 1 displays information regarding the results of the study on the condition of hard tissues of temporary teeth in the examined children with sensory deprivation of vision.

Table 1

**The intensity of the hard tissue lesions in temporary teeth
in the examined children with sensory deprivation of vision, (M±m)**

Groups	Indices	dft	dfs	D	F	Complications
6–8 years old, n=61		2.260± 0.220 p<0.001	2.305± 0.250	1.460± 0.090	0.815± 0.075	0.165± 0.020
11–14 years old, n=56		0.250± 0.010 p<0.005	0.250± 0.020	0.125± 0.010	0.125± 0.010	0
Average in Ukraine, 6–8 years old, n=1800		4.580± 0.540	–	–	–	–
Average in Ukraine, 11–14 years old, n=1800		0.290± 0.020	–	–	–	–

Note. p – index of the probability of differences in clinical indices of children with average indices in Ukraine.

Studies on the condition of hard tissues of temporary teeth in blind children have revealed some interesting findings. One study showed that dental complications were present in blind children aged 6–8 years old but were absent in children aged 11–14 years old. This suggests that there may be differences in dental hygiene practices or other factors that affect dental health between these age groups.

Moreover, the study found that blind children aged 11–14 years old had a significantly higher likelihood ratio of the intensity of hard tissue lesions in temporary teeth, as measured by the "dft" value, compared to the average indices in Ukraine. Specifically, the "dft" value was 1.16 times lower, indicating a higher prevalence of dental caries and other dental conditions. This suggests that blind children in this age group are at a higher risk of dental complications than their peers in the general population.

Interestingly, the study also found that the "dft" value in blind children aged 6–8 years old was two times lower than the average in Ukraine, indicating a lower prevalence of dental complications compared to the general population. This finding could be attributed to various factors, such as a lack of access to

sugary foods and drinks, or the presence of protective factors in the saliva of blind children that may help prevent dental complications.

Overall, these findings underscore the importance of targeted dental care for blind children, particularly those aged 11–14 years old. Dental professionals should be aware of the increased risk of dental complications in this group and develop effective prevention and treatment strategies to address their unique oral health needs. Further research is also needed to identify the factors contributing to these differences in dental health outcomes between blind children and the general population.

Table 2 displays information regarding the results of the study on the condition of hard tissues of permanent teeth in the examined children with sensory deprivation of vision.

Table 2

**The intensity of the hard tissue lesions in permanent teeth
in the examined children with sensory deprivation of vision, (M±m)**

Indices	DMFT	DMFS	D	F	M	Complications
Groups 6–8 years old, n=61	0.275±0.010	0.315±0.060 p<0.001	0.150±0.020	0.165±0.030	0	0
11–14 years old, n=56	1.480±0.130	1.585±0.140 p>0.1	0.660±0.105	0.925±0.120	0	0.110±0.020
Average in Ukraine, 6–8 years old, n=1800	–	0.200±0.050	–	–	–	–
Average in Ukraine, 11–14 years old, n=1800	–	2.100±0.200	–	–	–	–

Note. p – index of the probability of differences in clinical indices of children with average indices in Ukraine.

Analyzing the data of the hard tissues of teeth in children with sensory deprivation of vision it can be said that there is an increased intensity of caries in children aged 11–14 compared to children aged 6–8. In the investigated 6–8 year-olds, the values of the DMFS caries intensity index were significantly higher than the national average among 6–8 year-olds by 1.6 times (p<0.001). At the same time, when comparing the indicators of the same DMFS caries intensity index in children aged 11–14, no significant differences were found compared to the national average among children of the same age (p>0.1). Complications of caries were observed only in 11–14 year-olds with sensory deprivation of vision among all the investigated individuals. The overall results of the study can be used to develop effective strategies and programs for the prevention and treatment of tooth decay in children. For example, the data can help in developing programs to improve oral hygiene and limit the consumption of sweet and sour foods, which can reduce the prevalence of tooth decay among children.

The data presented above are evidence of increased intensity of caries in temporary teeth among children aged 11–14 years old and permanent teeth among children aged 6–8 years old with sensory deprivation of vision. This may be related to inadequate oral hygiene, dentofacial anomalies, and a high need for oral sanitation. Therefore, the next step of our research will be to analyze the data on periodontal tissue diseases and the state of oral hygiene in children with sensory deprivation of vision. It is important to note that promoting a healthy lifestyle is a crucial aspect of primary prevention of major dental diseases. However, the high prevalence of childhood disability and its increasing trend create significant challenges in providing medical care for this population of children [12]. Therefore, separate publications are dedicated to the issue of improving the effectiveness of implementing primary prevention programs for major dental diseases in children and adolescents with disabilities. One solution to this problem could be the development and implementation of a more effective pathogenetically justified therapeutic and preventive complex for this group of children with the use of psychological and pedagogical techniques. Such techniques can help increase the effectiveness of primary prevention of major dental diseases and reduce the prevalence of caries and other oral diseases in children with disabilities [5, 7–10, 14, 15]. It is important to take into account the somatic pathology features in such children and ensure them with quality and accessible dental care. Our research indicates the necessity of considering specific needs of children with disabilities in the development and implementation of primary prevention programs for dental diseases. Additional research is needed to identify the peculiarities of oral hygiene status and periodontal tissue diseases in children with disabilities. The development and implementation of innovative approaches to primary prevention of dental diseases in children with disabilities is an extremely important task. Such approaches can help reduce the prevalence of dental diseases and improve the quality of life for this group of children. Therefore, ensuring accessible and quality dental

care for children with disabilities is an extremely important task for modern society. Our research confirms the need for the development and implementation of effective approaches to primary prevention of dental diseases in this group of children.

Conclusions

1. As a result of the conducted research, it was established that the obtained data is evidence of the increased intensity of caries in children with blindness.

2. This study will undoubtedly contribute to the development of a well-founded and effective complex of therapeutic and preventive measures for the prevention of major dental diseases, methods of teaching oral hygiene to children with sensory deprivation of vision, and corrective programs for the prevention of major dental diseases in children.

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