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THE CONDITION OF THE PERIODONTAL TISSUES IN CHILDREN WITH DELAYED TEETH ERUPTION

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The study of the periodontal tissues in children with delayed teeth eruption is of significant scientific and practical interest and an urgent task for dentistry. A survey of 124 children of 7 and 8 years of both sexes was conducted and comprehensive study of the periodontal tissues was performed in this children. The results of the studies indicate a high prevalence and intensity of the periodontal tissue diseases in the children 7 and 8 years old with delayed teeth eruption. As a result, a high need for children with delayed teeth eruption in the treatment of inflammatory diseases of the periodontal tissues and the need of developing a therapeutic and preventive complex for this category of children were identified.

Key words: gingivitis, delayed teeth eruption, oral health, survey, children.

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СТАН ТКАНИН ПАРОДОНТА У ДІТЕЙ З ЗАТРИМКОЮ ПРОРІЗУВАННЯ ПОСТІЙНИХ ЗУБІВ

Вивчення тканин пародонта у дітей із затримкою прорізування зубів становить значний науково -практичний інтерес і є актуальним завданням для стоматології. Проведено обстеження 124 дітей 7-8 років обох статей і проведено комплексне дослідження тканин пародонту у них. Результати досліджень свідчать про високу поширеність та інтенсивність захворювань тканин пародонта у дітей 7 та 8 років із затримкою прорізування зубів. В результаті було виявлено високу потребу дітей із затримкою прорізування зубів у лікуванні запальних захворювань тканин пародонта та необхідність розробки лікувально-профілактичного комплексу для цієї категорії дітей.

Ключові слова: гінгівіт, затримка прорізування зубів, здоров'я порожнини рота, опитування, діти.

The work is a fragment of the research project "Correction of pathogenetic mechanisms of disorders of carbohydrate and lipid metabolism in the body and tissues of the oral cavity in patients depending on environmental and nutritional factors affecting carbohydrate and lipid metabolism", state registration No. 0118U006966.

Recent studies denote a high prevalence of inflammatory diseases of the periodontal tissues in children [9, 10, 11]. Most often, children are diagnosed with chronic catarrhal gingivitis, the prevalence of which reaches 80 % according to some authors [1, 6].

Periodontal diseases are characterized by morphological and functional changes in the tissues, the prevalence and severity of which depends on the state of somatic health of the child, the level of oral hygiene and age-related structural features of the periodontal tissues [7, 12]. Untimely diagnosis and treatment of inflammatory diseases leads to impairment in the formation of the periodontal tissues in children, which subsequently often causes severe and irreversible damage to the periodontal tissues in adulthood. Therefore, the paramount task of pediatric dentistry is a timely diagnosis of the periodontal tissue diseases and treatment taking into account the age-related structural features of the periodontal tissues, as well as the etiological and pathogenetic characteristics of the disease.

Important causes of the inflammatory process in the tissues of the periodontium are diseases of the nervous and endocrine systems [8, 14, 15]. The above disturbances can also cause changes in the timing of

delayed teeth eruption. Due to the fact that in most cases a high intensity of dental diseases can be a consequence of a somatic pathology in a child, an epidemiological study of the condition of the periodontal tissues in children with delayed teeth eruption is of significant scientific and practical interest [2, 13].

Thus, the study of the periodontal tissues in children with delayed teeth eruption is an urgent task for dentistry.

The purpose of this study was to research the main periodontal indices in 7 and 8 year old children with such pathology as delayed teeth eruption.

Materials and methods. A survey of 124 children of 7 and 8 years of both sexes was conducted. The main group of 7 years old included 31 children (15 boys, 16 girls) with delayed teeth eruption in whom there were no permanent teeth. The main group of 8 years old included 31 children (17 boys, 14 girls) with delayed teeth eruption in whom not more than 4 permanent teeth erupted. The comparison group of 7 years included 31 children (15 boys, 16 girls) without somatic diseases in whom delayed teeth eruption occurred on term. The comparison group of 8 years included 31 children (16 boys, 15 girls) without somatic diseases in whom delayed teeth eruption occurred on term.

The examination data were recorded in the cards of the dental examination of the child's oral cavity, developed at the department of pediatric dentistry of SE "ISMFS NAMS" [2].

For the objective assessment of the state of the periodontal tissues in children, a comprehensive study of the periodontal tissues was performed using periodontal indices. Using the PMA index (Parma), the prevalence of the inflammatory process in the periodontal tissues was assessed and the severity of gingivitis was determined: up to 25 % – mild, from 25 % to 50 % – moderate and above 50 % – severe. The degree of the inflammatory process was determined by the intensity of staining of the gum tissue with an iodine-containing solution using a Schiller-Pisarev test. Bleeding was determined by probing the gingival sulcus according to Muhnlemann, Son (1971) [3].

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 $p<0.01$.

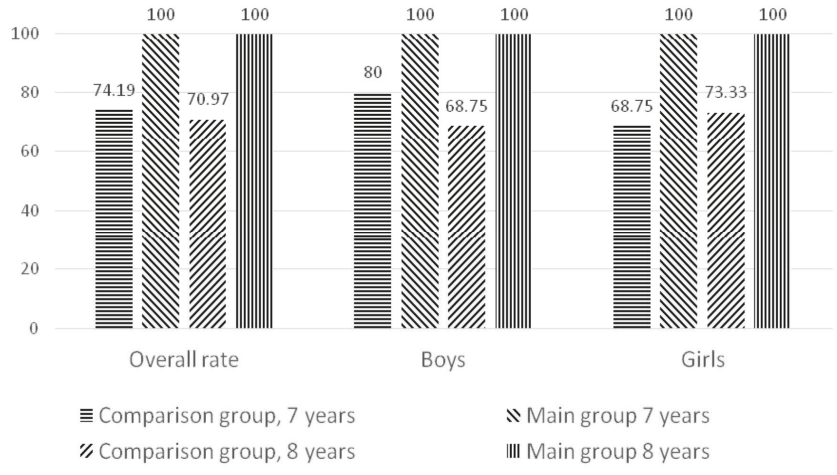

Fig.1. The prevalence of gingivitis in the examined children, %

Results of the study and their discussion. As a result of studies of the periodontal tissues condition, a higher prevalence of chronic catarrhal gingivitis in the children with delayed teeth eruption was established compared to the children whose delayed teeth eruption occurred on term (fig. 1).

So, in 100 % of children of 7 years of the main group, inflammatory diseases of the periodontal tissues were revealed, which was by 25.81 % more than in the children of the comparison group. In the boys of the main group of 8 years, the prevalence of gingivitis was by 31.25 % higher than in those of the comparison group. In the girls of the main group of 8 years, the prevalence of gingivitis was 100 %, which was by 26.67 % more than in the girls of the comparison group of this age.

As a result of the data analysis of the index assessment of the periodontal tissues, it was found that in the children with delayed teeth eruption the PMA (Parma) index values were significantly higher than in the children in comparison groups (table 1).

So in the children of the main group of 7 years, the PMA (Parma) index was 2.1 times higher than in the children in the comparison group of 7 years. In the children with delayed teeth eruption of 8 years, the PMA index was 2.26 times higher than that in the comparison group of 8 years.

The bleeding index (Muhnlemann, Son) in the children of the main group of 7 years old was 0.52±0.04, which was by 92.6 % more than in the children in the comparison group. In the children of the main group of 8 years, the bleeding index was by 78.57 % higher than in the children in the comparison group of this age.

□□bl□1

Data on an index assessment of the periodontal tissues, M±m

Group	Index PMA, %	Index of bleeding of Muhnlemann, Son, points	Schiller-Pisarev test
Comparison group 7-year-old (n=31)	9.26±1.48	0.27±0.04	1.20±0.04
Main group 7-year-old (n=31)	19.41±1.85 p_1<0.001	0.52±0.04 p_1<0.001	1.68±0.04 p_1<0.001
Comparison group 8-year-old (n=31)	8.31±1.26	0.28±0.04	1.24±0.04
Main group 8-year-old (n=31)	18.77±1.36 p_2<0.001	0.50±0.05 p_2<0.001	1.66±0.05 p_2<0.001

Note. p_1 – the index of the reliability of differences relative to the comparison group of 7 years; p_2 – the index of the reliability of differences relative to the comparison group of 8 years;

Analyzing the data obtained from the index assessment of the periodontal tissues, it is worth noting the greater importance of the Schiller-Pisarev test in the children with delayed teeth eruption. So, in the children of the main group of 7 years, this index was by 40 % more than that of the children in the comparison group of this age. In the children of the main group of 8 years old, the Schiller-Pisarev test was by 42 % more compared to the index of the comparison group of 8 years.

The characteristic features of the inflammatory process in the periodontal tissues by the PMA % index in the children of all groups is presented in table 2.

□□bl□2

Characteristics of the inflammatory process in the periodontal tissues by the PMA % index in children

Group	No inflammation, PMA=0	Mild gingivitis, PMA>25.0 %	Moderate gingivitis, 25.0 %>PMA<50.0 %	Severe gingivitis, PMA>50.0 %
Comparison group 7-year-old (n=31)	25.81	64.51	9.68	0
Main group 7-year-old (n=31)	0	74.19	25.81	0
Comparison group 8-year-old (n=31)	29.03	70.97	0	0
Main group 8-year-old (n=31)	0	67.74	32.26	0

There was revealed the inflammatory process in the periodontal tissues in all children of the main group of 7 years old and the main group of 8 years old. The absence of the inflammatory process was observed in 25.81 % of the children in the comparison group of 7 years old and in 29.03 % of the children in the comparison group of 8 years. A mild degree of gingivitis was observed in 64.52 % of the children in the comparison group of 7 years old, which was by 3.22 % less than the prevalence of this disease in the children of the main group of 7 years old. 70.97 % of children in the comparison group of 8 years old were diagnosed to have a mild degree of gingivitis, which was by 3.23 % higher than the prevalence of this disease in children of the main group of 8 years old.

A moderate degree of gingivitis was more frequently observed in the children of the main groups. So, the moderate degree of gingivitis was diagnosed in 25.81 % of the children of the main group of 7 years old, which was by 16.13 % more frequently than in the children of the comparison group of this age. In the children of the comparison group of 8 years, the moderate degree of gingivitis was not detected; in children of the main group of 8 years, the moderate degree of gingivitis was diagnosed in 32.26 %. A severe degree of gingivitis was not detected in the examined children of all groups.

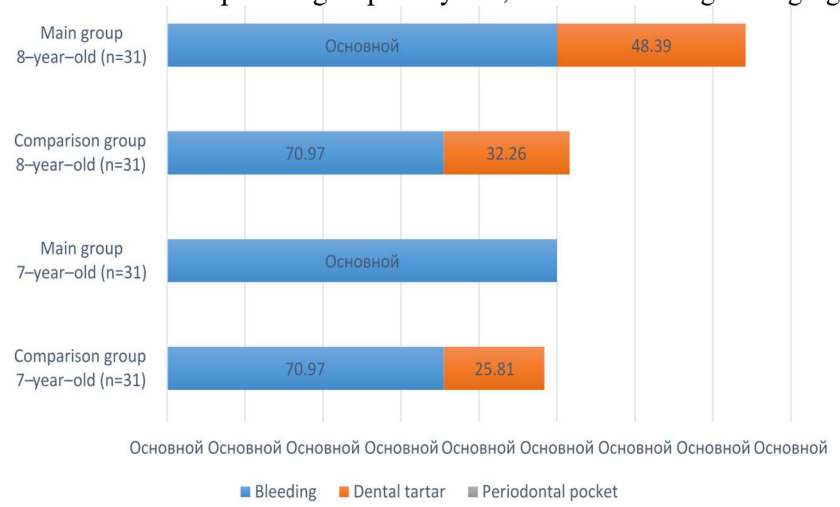

Fig.2. The state of periodontal tissues in the examined children by CPITN index, %

As a result of the analysis of the structure of CPITN (community periodontal index of treatment need), its main criteria are: bleeding, tartar, periodontal pocket, it is worth noting the high prevalence of bleeding symptoms in children with delayed teeth eruption (fig. 2).

Gum bleeding was observed in 100 % of the children of the main group of 7 years, which was by 29.03 % more often than in the children of the comparison group of 7 years. In the children of the main group of 8 years, gum bleeding was noted by 29.03 % more often than in the children of the comparison group of 8 years.

Dental tartar in the children with delayed teeth eruption of 7 years old has not been identified. In the children of the main group of 8 years old, tartar was detected in 48.39 % of children, which was by 16.13 % more than in the children of the comparison group of 8 years. A pathological gingival pocket was not identified in the children examined.

Despite the ongoing sanitary and educational work by dentists, one of the reasons for the increase in the prevalence of major dental diseases is the lack of knowledge about oral care and the low motivation of children and their parents to oral hygiene [5, 10], pollution of the place of residence of children [4], their genetic characteristics [4], as well as complications caused by somatic diseases [13, 14]. The high prevalence of inflammatory processes in the oral cavity in the children with delayed teeth eruption of 7 and 8 years of age indicates impaired functional and adaptive responses in the oral cavity and in the child's body as a whole and is a consequence of pathological processes that cause delayed teeth eruption. During the examination of the oral cavity of the children with delayed teeth eruption, there were noted the main symptoms of chronic catarrhal gingivitis: hyperemia and swelling of the gums, and bleeding during instrumental examination. The symptoms described forced children to change their diet and reduce the amount of solid food (fresh vegetables) in their diet. In addition, due to the presence of inflammatory processes of the periodontal tissues and, as a consequence, the presence of bleeding, children were forced to reduce the frequency and time of teeth brushing. According to the parents of the children with delayed teeth eruption, such a forced change in diet and regularity of teeth brushing was not a reason for contacting a dentist. The prolonged presence of gingivitis in the examined, the lack of treatment for the disease can lead to its generalization and complications in future. The data obtained from the study of the periodontal tissues indicate the need for further in-depth study of the dental status of the children with delayed teeth eruption, emphasize the need for biochemical studies of the oral fluid in order to identify disorders of homeostasis of the oral cavity and identify possible disorders that cause changes in the dental status in this group of children. Due to the greater prevalence and intensity of inflammatory diseases of the periodontal tissues in the children with delayed teeth eruption [8], the conducted studies emphasize the need to develop a pathogenetically targeted treatment and preventive complex that takes into account factors affecting the development of the pathology, which will prevent the development of severe forms of inflammatory diseases of the periodontal tissues.

Conclusions

1. The data obtained indicate a high prevalence (prevalence of gingivitis was 100 % and bleeding was also 100 %) and intensity of the periodontal tissue diseases (PMA index and index of bleeding of Muhnlemann was 2 times higher in comparison with groups of children without somatic diseases) in the children 7 and 8 years old with delayed teeth eruption.

2. As a result of the studies, a high need for children with delayed teeth eruption in the treatment of inflammatory diseases of the periodontal tissues and the need of developing a therapeutic and preventive complex for this category of children were identified.

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THE RESULTS OF EXPERIMENTAL COMPUTER MODELING IN STABILIZATION OF TRANSPEDICULAR SYSTEMS USED IN THE SURGICAL TREATMENT OF VARIOUS PATHOLOGIES OF THE SPINE

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The proposed method was experimentally modeled using the Solid Works computer program and put into practice in 32 patients aged 13–65 years in the period 2014–2018, with various pathologies of the spine. Of these, 22 (68.75 %) are female, 10 (31.25 %) are male. The patients were operated with transpedicular systems of various configurations. To prevent spontaneous displacement of the screws in the long-term postoperative period, a technique was proposed for creating an additional support point by conducting a transverse connector through a transverse hole made in the spinous process of the vertebra. 2 situations were considered. In the first case, a fixed vertebra with a classically drawn transverse connector and the applied driving forces of pulling the screws out of the vertebral body in eight different directions. The second case was similar to the first one with a difference in conducting the connector through the spinous process of the vertebra. In both groups, the displacement distance increases with an increase in the angle of the vector of the applied force. The force for the screws to exit the channel was 26.561 N/mm^2 (MPa). In the second case, it was 31.095 N/mm^2 (MPa). The difference was 5 N/mm^2. The method of creating an additional support point for transpedicular systems by passing a transverse connector through the spinous process of the vertebra, a statically proven method, increases the stability of transpedicular systems.

Keywords: loosening of the implant, fixation of the transpedicular screw, loosening of the transpedicular screw, spinal surgery.

Т.Я. Джалілов

РЕЗУЛЬТАТИ ЕКСПЕРИМЕНТАЛЬНОГО КОМПЬЮТЕРНОГО МОДЕЛЮВАННЯ ДЛЯ СТАБІЛІЗАЦІЇ ТРАНСПЕДИКУЛЯРНИХ СИСТЕМ, ЯКІ ЗАСТОСОВУЮТЬСЯ ПРИ ХІРУРГІЧНОМУ ЛІКУВАННІ РІЗНИХ ПАТОЛОГІЙ ХРЕБТА

Запропонований метод експериментально змодельовано за допомогою комп'ютерної програми Solid Works і впроваджено в практику у 32 хворих у віці 13–65 років в період 2014–2018 років, з різними патологіями хребта. З них 22 (68,75%) жіночої, 10 (31,25%) чоловічої статі. Хворі були оперовані транспедикулярного системами різної компоновки. Для профілактики самовільного зміщення гвинтів у віддаленому післяопераційному періоді була запропонована методика створення додаткової точки опори шляхом проведення поперечного коннектора через поперечний отвір, прооблений в остистому відростку хребця. Були розглянуті 2 ситуації. У першому випадку фіксований хребець з класично проведеним поперечним коннектором і застосовані рушійні сили витягування гвинтів з тіла хребця в восьми різних напрямках. Другий випадок був аналогічний першому з різницею в проведенні коннектора через остистий відросток хребця. В обох групах відстань зсуву збільшується зі збільшенням кута вектора застосовуваної сили. Сила для виходу гвинтів з каналу була 26.561 N/mm^2 (MPa). У другому випадку, вона склала 31.095N/mm^2 (MPa). Різниця була 5 N/mm^2. Метод створення додаткової точки опори транспедикулярним системам шляхом проведення поперечного коннектора через остистий відросток хребця, статично доведений метод, збільшує стабільність транспедикулярних систем.

Ключові слова: розхитування імпланта, фіксація транспедикулярного гвинта, розхитування транспедикулярного гвинта, операція на хребті.

This work is a fragment of a doctoral dissertation: "Optimization of the use of polysegmental correcting transpedicular systems in the surgical treatment of deformities and degenerative dystrophic processes of the spine".

In 1959, G. G. Boucher was the first to conduct a transpedicular fixator into the vertebral body through the leg, describing the possibility of fixing the vertebra [2].

With the introduction of transpedicular fixation into orthopedic practice, the stability of the fixation of the vertebral segment significantly increased, which made it possible to increase the correction of deformities that appeared in various pathologies. The increase in stability led to an increase in the metal-bone conflict due to the different densities of these substances. Patients may experience weakening and displacement of the implant during implantation of pedicular screw systems, which leads to the appearance of pain syndrome and loss of the received correction. So, in 2014, Abul Kasim and Olin studied 1,666 dislocations of the pedicular screw in 81 patients suffering from idiopathic scoliosis and patients were examined several times during 2 years