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ОСОБЛИВОСТІ СТОМАТОЛОГІЧНОЇ ЗАХВОРЮВАНОСТІ У ДІТЕЙ ІЗ ДИТЯЧИМ ЦЕРЕБРАЛЬНИМ ПАРАЛІЧЕМ

Для сучасного етапу розвитку дитячої стоматологічної допомоги у світі характерна підвищена увага до проблем забезпечення кваліфікованою медичною лікувально-профілактичною допомогою дітей із обмеженими фізичними можливостями. В даний час найбільш поширеним неврологічним захворюванням, що діагностується у дітей в ранньому віці, є дитячий церебральний параліч (ДЦП).

Полісіндромний характер даної патології визначає різноманіття клінічних проявів, в тому числі високий ризик виникнення стоматологічної патології.

При ДЦП ушкоджуються кіркові, підкіркові, ствольні структури головного мозку. Порушуються функції організму: функції м'язів, рухів, прийому їжі тощо, вплив яких на формування зубоцеліпних аномалій загальновідомий, як і поєднання морфологічних порушень розвитку зубоцеліпної системи з міофункціональними порушеннями, які роблять зубоцеліпно-лицевий комплекс нестійким до фізіологічних навантажень. Наприклад, формування рухового стереотипу, становлення у здорової дитини мовних функцій мають закономірності. Якщо у здорової дитини лепет вже достатньо сформований і вдосконалюється функція дихання, то у дітей з ДЦП у цей період відзначаються порушення тонусу м'язів артикуляції, обмеження довільних рухів язика і губ, оральні синкінезії, утруднення процесу годування. З цього випливає, що моторні порушення при ДЦП стосуються не лише кінцівок і тулуба, а й целіпно-лицьової ділянки. При

цьому у дітей із ДЦП уповільнено формування рухових функцій, порушено координацію тонких, диференційованих рухів, що призводить до неможливості правильного догляду за порожниною рота у таких дітей.

Мета дослідження. Вивчення особливостей клінічних проявів дитячого церебрального паралічу в порожнині рота у дітей.

Методи дослідження. Аналіз та узагальнення літературних даних, систематизація інформації про виявлені зміни стану порожнини рота у дітей з ДЦП.

Наукова новизна. Вивчення та систематизація причинно-наслідкових зв'язків розвитку основних стоматологічних захворювань та їх залежність від вираженості неврологічної симптоматики дозволить розробити комплекс лікувально-профілактичних заходів, що призведе до поліпшення якості життя дітей з ДЦП.

Висновки. У дітей, які страждають на ДЦП, відзначається стійка тенденція до підвищення частоти та інтенсивності каріозних уражень, помірно виражені запальні явища в пародонті. Найбільш важка зубоцеліпна патологія найчастіше спостерігається у дітей, які мають мовленнєві порушення.

Діти з ДЦП мають підвищений ризик розвитку стоматологічних хвороб, що зумовлюється характером основного й супутніх захворювань, і тому потребують особливої уваги з боку лікаря-стоматолога щодо своєчасного проведення лікувально-профілактичних заходів із врахуванням перебігу неврологічного захворювання.

Ключові слова: діти, дитячий церебральний параліч, карієс, гінгівіт, зубоцеліпні аномалії.

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ORAL HEALTH AND SPECIAL FEATURES OF DENTAL MORBIDITY IN CHILDREN WITH CEREBRAL PALSY

The current stage of development of children's dental care in the world is characterized by increased attention to the problems of providing qualified medical treatment and

preventive care to children with disabilities. Currently, the most common neurological disease diagnosed in children at an early age is cerebral palsy (CP).

The polysyndromic nature of this pathology determines the variety of clinical manifestations, including a high risk of dental pathology.

Cortical, subcortical, stem structures of the brain are damaged with cerebral palsy. The functions of the body are disturbed: the functions of muscles, movements, food intake, etc. the influence of these symptoms on the formation of dentoalveolar anomalies is well known, as well as the combination of morphological disorders in the development of the dentoalveolar system with myofunctional disorders. The above-mentioned factors make the dentofacial complex unstable to physiological stress. For example, the formation of a motor stereotype, and the formation of speech functions in a healthy child have their patterns. If in a healthy child babble is already sufficiently formed and the respiratory function is improving, then in children with cerebral palsy during this period there are violations of the tone of the articulatory muscles, restriction of voluntary movements of the tongue and lips, oral synkinesis, difficulty in the feeding process, and reflexes of oral automatism are expressed. That is why the motor disorders in cerebral palsy affect not only the limbs and trunk but also the maxillofacial region. At the same time, in children with cerebral palsy, the formation of motor functions is delayed and impaired, and coordination of fine, differentiated movements are impaired, which proves the complexity of oral care in such children.

The aim of the study. Our study is devoted to special features of the clinical manifestations of cerebral palsy in the oral cavity of children.

Materials and methods. Analysis and generalization of literary data, systematization of information about the changes in the oral cavity in children with cerebral palsy.

Scientific novelty. The study and systematization of the cause-and-effect relationships of the development of the main dental diseases and their dependence on the severity of neurological symptoms. This information allows to development of a complex of therapeutic and preventive measures, which will lead to an improvement in the quality of life of children with cerebral palsy.

Conclusions. There is a sustainable trend toward an increase in the frequency and intensity of carious lesions and moderately pronounced inflammation in the periodontium in children with cerebral palsy. The most severe dentoalveolar pathology is most often observed in children with speech disorders.

Children with cerebral palsy have an increased risk of dental disease. It is determined by the main and accompanying diseases, and therefore requires special attention from the dentist regarding the timely implementation of treatment and preventive measures, considering the course of the neurological disease.

Key words: children, cerebral palsy, caries, gingivitis, dental anomalies.

Formulation of the problem. Cerebral palsy (CP) remains one of the most common diseases of the nervous system in Ukraine, the frequency of which is 2.5 cases per 1,000 children [1]. Cerebral palsy is a general term for a group of persistent non-progres-

sive motor syndromes that are often combined with mental and speech disorders and develop because of organic damage to the central nervous system during its development [2]. The disease occurs due to damage to the brain during the period of intrauterine development, childbirth, and the newborn period. It is manifested by movement disorders – paresis, paralysis, hyperkinesis of the muscles of the arms, neck, and trunk, and speech disorders [3]. The pyramidal central motoneuron has functional heterogeneity along its entire length according to literature data. Therefore, the spastic syndrome may develop when different parts of the pyramidal central motoneuron are affected. It determines the clinical picture of cerebral palsy of varying severity. This can significantly affect the functioning of various organs and systems, in particular the maxillofacial area [4].

The aim of the study. Studying the special features of the clinical manifestations of cerebral palsy in the oral cavity of children.

Materials and methods. Analysis and generalization of literary data, systematization of information about the detected changes in the condition of the oral cavity in children with cerebral palsy.

Results and their discussion. Most children with spastic forms of cerebral palsy develop with a delay in static-kinetic and psycholinguistic development. They begin to hold their head, roll over from their back to their stomach, sit later, and begin to walk at 2-7 years of age only with support. Violations of the functional capabilities of the hands of varying degrees of severity are observed: from mild violations of fine motility to gross pronator-flexion settings in hands with a sharp limitation of voluntary movements. Muscle tone in most of these patients is increased by the spastic type, sometimes with hyperkinesis [5].

Children with cerebral palsy are distinguished by a lack of coordination between antagonistic muscle groups, which leads to the development of a pathological motor stereotype, contractures and deformations, innervation disorders, and neurotrophic changes [6, 7]. Spasticity of gait, tics, myoclonus, hyperreflexia, and other neurological symptoms are characteristic of children with various clinical forms of cerebral palsy [8]. At the same time, there are also disorders of neuroendocrine regulation, which leads to homeostatic disorders, and changes in the activity of exocrine and endocrine secretion [9].

Pathological changes in the maxillofacial system are detected in most patients with perinatal organic lesions of the brain [10, 11]. For example, congenital and acquired defects of tooth tissues, bite anomalies, bruxism, etc. Due to the difficulties of performing

hygienic care of the oral cavity, children with CP are often diagnosed with a high level of caries, which can be a source of chronic infection and intoxication and be accompanied by concomitant damage to the tissues of the periodontium and the mucous membrane of the oral cavity. Dental morbidity correlates with the severity of movement disorders and the degree of expressiveness of hypertension [12].

Most children with cerebral palsy have speech disorders in the form of pseudobulbar dysarthria or anarthria. The spasticity of the articulatory muscles is revealed during examining the articulatory apparatus. A spastic increase in muscle tone in the circular muscle of the mouth leads to the tension of the lips, a sharp limitation of active movement of all the organs of articulation, and, accordingly, to insufficient pressure of the tongue on the frontal part of the alveolar process of the lower jaw from the side of the oral cavity. As a result, there is no stimulation of growth of the lower jaw in the sagittal direction. In addition, insufficiency of voluntary articulatory movements manifests itself in the form of impaired breathing, swallowing, difficulty chewing, and choking during meals [13].

Sluggish chewing, characteristic of children with cerebral palsy, disrupts the phases of biting off food with incisors and tearing with canines, as well as chewing with premolars and molars. The passivity of chewing provokes a slowdown in the natural abrasion of the bumps of milk canines and molars, which in turn leads to the limitation of sagittal and transverse movements. These disorders lead to uneven growth of the facial skeleton and insufficient grinding of food in the oral cavity. It causes the defective secretory activity of the gastrointestinal tract and leads to micro traumatization of the mucous membrane of the stomach and a general decrease in energy expenditure in the body [14]. The most severe dental pathology is more often observed in children with cerebral palsy who have speech disorders [15].

Speech disorders and dental anomalies are manifested by interdependence and mutual aggravation, while the pathology of the dental apparatus disrupts articulatory and expressive speech activity and prevents its development. In its turn, neuro-motor afferent and efferent speech disorders are the basis of dysarthric manifestations and create neurotrophic conditions for aggravation of dental and jaw pathology, namely, a self-sustaining stable symptom complex of dentition and speech disorders. They are caused by multilevel dysontogenesis, affecting the development of the structures of both the nervous system and the organs of the dentition system [16].

Insufficiency of chewing and swallowing functions caused by damage to bone and muscle tissue in children with cerebral palsy, unsatisfactory oral hygiene due to hyperkinesis of the limbs, or intellectual disability are risk factors for the development of diseases in the oral cavity.

The prevalence of caries in children with cerebral palsy is high [16, 17], its value ranges from 54.8% [18] to 93-100% [10, 18]. The highest rates of dental caries were found in both milk and permanent teeth. The risk of developing dental caries in this contingent of children was directly proportional to the degree of cognitive and motor deficit [19]. The main reasons for significant dental caries damage in children with cerebral palsy can be an unsatisfactory level of individual oral care, a decrease in the protective and remineralizing functions of the oral fluid due to a change in the functioning of the salivary glands because of a significant number of medications [10, 18]. The nutritional features with the predominance of easily digestible carbohydrates, and the difficulty of timely implementation of medical and preventive measures that would prevent the progression of the initial forms of dental disease also influence the salivary glands [13].

A significant problem in children with cerebral palsy is periodontitis and gingivitis [2, 6]. The prevalence of periodontal diseases reaches 94.4% in children and adolescents aged 7-18 years with cerebral palsy [20]. The dependence of periodontitis on the severity of the above-mentioned disease was revealed. Lesions of periodontal tissues in children with cerebral palsy are largely caused by their overload due to hypertonus of the masticatory muscles, and unsatisfactory individual oral hygiene [21].

It was established that chronic catarrhal gingivitis (CCG) in patients with cerebral palsy is accompanied by an increase in the frequency of detection and concentration of such microorganisms as *Streptococcus*, *Staphylococcus*, *N. Catarrhalis*, and *Candida* fungi and a decrease in *Lactobacillus*, then in children with CCG without concomitant somatic diseases. Structural reorganization of the biocenosis of the oral cavity in patients with cerebral palsy with an increase in the degree of severity of the inflammatory process in the periodontium is characterized by an increase in the concentration of *Streptococcus*, *Neisseria*, and *Candida* with a decrease in the dominance of resident microflora and *Lactobacillus*, which can significantly change the local immunity of the oral cavity [22].

The physical properties of the oral fluid are significantly disturbed in children with CCG and cerebral palsy (increased viscosity, hyposalivation and

decreased acidity), namely, the quantitative increase of opportunistic microflora (increased urease activity) and intensification of inflammatory processes (increased elastase and aspartate transaminase) [23].

The phenomena of acquired combined immune deficiency are observed in children with cerebral palsy with CCG. It is manifested by an increase in the level of the pro-inflammatory cytokine IL-1 β and a decrease in the concentration of the anti-inflammatory cytokine IL-4; disturbance in the humoral chain of immunity – activation of IgA and IgG production. A deficiency of sIgA and lysozyme was established in the oral fluid of children with cerebral palsy, which can serve as a marker of the intensification of the inflammatory process in the periodontium [20].

The leading local factor in the occurrence and progression of dental diseases, such as dental caries and gingivitis, is unsatisfactory oral hygiene, which is particularly evident in children with cerebral palsy [5, 8, 9]. Numerous studies have proven that children with cerebral palsy, especially those with severe motor disorders, have significantly worse hygiene indices compared to healthy children [3, 5, 8], and the level of hygiene awareness is low [2].

The unsatisfactory state of oral hygiene in children with cerebral palsy can be explained by several reasons, which include:

- violation of motility of hands, which makes it impossible to perform high-quality cleaning of the child's teeth;
- mental disorders that make it difficult to realize the need for proper and regular care of the oral cavity;
- violation of the swallowing reflex in the structure of the pseudobulbar syndrome in children with cerebral palsy, which makes it difficult to chew and swallow food and leads to the predominance in the diet of chopped food of mainly carbohydrate nature;
- violation of the function of the tongue, which complicates self-cleaning of the oral cavity and cleaning with a brush;
- anomalies of the maxillofacial system and bite pathology observed in the majority of children with cerebral palsy with motor disorders and complicating oral care;
- a significant use of medications, often containing sugar or those that can affect the functioning of the salivary glands and the composition of saliva.

The low level of parents' awareness of maintaining their children's dental health also has its basis. One of the main reasons is the high concentration on the main disease and insufficient attention to the hygienic condition of the oral cavity as a secondary issue. In addition, the level of sanitary and educa-

tional work regarding dental prevention among the population of Ukraine remains quite low.

At the same time, oral care in children with cerebral palsy is much more difficult than in healthy children, due to difficulties in self-care, behavioral reactions, and mental disorders [24].

Considering the above-mentioned information, it is possible to outline directions for improving the dental health of this contingent of children by optimizing their oral care:

1. Educational work among parents, children, as well as pediatric neurologists who take care of these children, regarding the ways and the possibility of maintaining dental health. The information should be properly adapted specifically for this category of parents and children and contain special recommendations on dental hygiene.
2. Children with cerebral palsy need the development of individual dental prevention programs and oral hygiene, depending on the level of motor and mental disorders. This program should include practical recommendations for brushing teeth using both traditional and individually adapted tools.
3. Regular dental check-ups with the correction of individual care depending on the severity of motor disorders and the state of oral hygiene [1].

Thus, children with cerebral palsy have an increased risk of developing dental diseases, which is determined by the severity of the main disease and other somatic disorders diseases, and therefore require special attention from the dentist regarding the timely implementation of treatment and preventive measures, considering the course of the neurological disease.

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