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In children with tmj dysfunction assessment of some indicators of oral fluid

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Abstract: The problem of the relationship between dental and somatic health in children and adolescents is of interest to researchers and does not lose relevance. First, this is due to the tendency to increase the frequency of somatic and dental diseases in children. Secondly, this is due to the fact that there are modern concepts of the development of diseases, new clinical forms of pathologies, improved methods of research, diagnosis and treatment (1,2,4,13).

Key words: clinical index, TMJ disease, oral cavity , dental instruments.

INTRODUCTION

In the structure of dental diseases, dental anomalies and deformities have a significant share. It is established that one of the factors that support a significant frequency of morphological and functional disorders in the dental system in the child population are general somatic diseases. The analysis of literature sources indicates that the state of the dentofacial complex in children with temporomandibular joint disease (TMJ) has not been sufficiently studied) (3,5,7). It is necessary to assess changes in homeostasis, the state of local factors of non-specific protection of the oral cavity in children with TMJ pathology. Research in this direction will allow us to develop a set of measures aimed at reducing the reactive inflammatory changes in the prosthetic bed mucosa and periodontal tissues in the orthodontic treatment of children with TMJ disease. This will improve the quality of orthodontic care for this category of children (3,4,8).

It is established that in children with pathology of the TMJ is observed depletion of the reserve capacity of the antioxidant, antimicrobial protection against increase of lipid peroxidation and contamination of the mouth of pathogenic and conditionally pathogenic microflora, as well as reducing the pH stability of oral fluid and reducing the level of cell metabolism (7,9). Based on the above, the purpose of this study was to study the biochemical parameters of oral fluid in children with TMJ disease.

Material and methods of research. The examination of sick children included a survey, examination, assessment of the condition of the hard tissues of the teeth, noted the presence of anomalies and deformities of the dentition, the condition of the temporomandibular joint. When collecting anamnesis, complaints were clarified, when pain or noise first appeared in the area of the temporomandibular joint, how often they occur, whether treatment was carried out, and how effective it was.

The examination of the oral cavity was carried out in the conditions of a dental office, under artificial light with the help of a standard set of dental instruments - a mirror and a dental probe. Data on the displacement of the lower jaw in the vertical, sagittal and transversal planes were obtained during an external examination of the face with closed dentition in the position of relative physiological rest and with the maximum opening of the mouth. Patients were examined according to a standard Protocol, which included: the definition of a bite, the ratio of the first permanent molars on the classification of Angle, the DMF index, index EROPS 1 and 2 molars on V. Yu Milicevic, 1984. Palpation of the temporomandibular joint was performed through the skin, in front of the tragus of the ear or through the anterior wall of the external auditory canal when closing the lower jaw and during its movements. Palpating the masticatory muscles, painful and compacted areas were determined, as well as the presence of trigger points. The degree of temporomandibular joint dysfunction was determined using the Helkimo clinical index. The survey of the subjects was conducted using a specially developed questionnaire to identify TMJ pathology, the assessment was carried out in points.

X-ray examination of the temporomandibular joint in 45 patients aged 6 to 15 years with internal disorders of the temporomandibular joint was carried out in Bukhara. The results of dental examination of patients

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was carried in out-patient medical record f-043/a-2/88, for students in remedial card account (form 267) and a specially designed map to assess the dental status. In the passport part of the card, the identification number, surname, first name, patronymic, year of birth, date of filling in, address, transferred and concomitant diseases were recorded.

In the course of work in the oral fluid of children with TMJ disease and in practically healthy children, the following parameters were evaluated:: the content of malondialdehyde (MDA), the activity of catalase, elastase, urease, lysozyme.

The determination of urease activity in the oral fluid was carried out by a method based on the ability of this enzyme to break down urea to ammonia, which, with Nessler's reagent, gives a yellow staining. The color intensity of the sample is directly proportional to the activity of urease, which was expressed in micromoles of ammonia formed in 1 minute in 1 ml of oral fluid [Gavrikova L. M, 1996]. The determination of lysozyme activity in the oral fluid was carried out by a bacteriological method based on the ability of lysozyme to lyse bacteria. When the lysozyme interacts with the Micrococcus lysodeikticus substrate, the substrate cleavage is observed, which is recorded spectrophotometrically. The degree of enlightenment is proportional to the activity of lysozyme, which was expressed in units/ml of oral fluid [Levitsky A. P., 2005]. The activity of catalase in the oral fluid was evaluated using a method based on the ability of hydrogen peroxide, which did not react with catalase, to combine with molybdenum salts in a persistent orange complex. The color intensity is proportional to the catalase activity, which was expressed in millikatals/l of oral fluid [Girin S. V. 1999]. The content of malonic dialdehyde was determined by reaction with 2-thiobarbituric acid. In this case, a colored trimethyl complex is formed. The concentration of malondialdehyde is proportional to the extinction in the reaction medium of the test sample, expressed in micromoles/l of oral fluid [Steel I. D. 1977]. The elastase activity was evaluated by hydrolysis of the synthetic substrate N-t-BOC-L-alamn-p-mtrophenyl ester (Germany "Sigma"). Under the action of elastase, p-nitrophenol is cleaved from the substrate, giving a yellow staining, the intensity of which is proportional to the activity of the enzyme. The elastase activity was expressed in nanocatals per 1 liter of oral fluid, 1 cathal is the elastase activity that catalyzes the cleavage of 1 mole of p-nitrophenol [Visser L, 1972].

Statistical processing of the material was carried out using the Statistica 6.0 application software package. Quantitative indicators were checked for compliance with the normal distribution using the Student's t-test. To compare the samples with a distribution close to normal, the Student's criterion was used.

The results of the study and their discussion. The debut of the work was a broad clinical study of a large group of children with TMJ pathology, which revealed the following significant patterns. When assessing the genealogical history in children of this group, there was a burdened heredity not only for diseases of the gastrointestinal tract (80.8%), but also for diseases formed against the background of undifferentiated connective tissue dysplasia (NDST), namely, varicose veins of the lower extremities (57.7%), myopia (40.4%), which is consistent with the data of V. V. Suitcase (2010) studies on the important role of NDST in the development of chronic pathology in children. Almost a fifth of children with TMJ disease (23.1%) were born by caesarean section. A large birth weight (more than 4000 g) was observed in every fifth child (19.2%) of the main group of the survey, which is significantly more than in the children of the comparison group ($p < 0.05$).The duration of breastfeeding in the children of the main group was significantly less than in the children of the comparison group and the control group, in addition, only 9.6% of children. Therefore, the clinical and anamnestic markers identified at the first stage allow us to speak with a high degree of probability about the presence of genetically determined undifferentiated connective tissue dysplasia in children with TMJ pathology.

Using laboratory methods, we studied the biochemical parameters that characterize the state of homeostasis and the level of nonspecific resistance in the oral cavity in children with TMJ disease.

An important mechanism of homeostasis in the oral cavity is the balance in the pro-oxidant-antioxidant system. In the course of the work, the activity of catalase, MDA, elastase, lysozyme and urease, which are presented in Table 1, was studied.

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Table 1
Dynamics of changes in the biochemical parameters of oral fluid in healthy children and with TMJ disease (mcat/l, mc-cat/l and u / ml,, mc-cat/L)

Indicators	Children with TMJ disease n=48	Healthy children (control) n=15
Catalase activity	0,122±0,021*	0,324±0,024
Malonic dialdehyde	0,305±0,032*	0,129±0,016
The activity of elastase	2,97±0,16*	1,72±0,14
Lysozyme activity	0,025±0,004*	0,093±0,008
Urease activity	0,417±0,034*	0,096±0,011

Note: * - the significance of differences P< 0.05 when compared with the control

These tables show that the catalase activity in children with AD at the initial clinical and laboratory study was on average 2 times lower than in children with practically healthy children. This indicates the depletion of the reserve capacity of the antioxidant system in children with AD. Considering that the genesis of TMJ pathology in children is highly important for the membrane-pathologic processes at the level of cellular factors, and the important mechanism leading to the destabilization of cell membranes is the process of lipid peroxidation (POL). In the course of the work, the level of malondialdehyde (MDA) in the oral fluid was studied. The results of the studies showed that in children with TMJ pathology, the MDA content was significantly higher than in practically healthy children. This indicated a local "in the oral cavity" intensification of the processes of lipid peroxidation in children with TMJ disease. The results of the study of the degree of inflammatory processes in the oral cavity, the intensity of which characterizes the activity of the leukocyte proteolytic enzyme elastase in the oral fluid, are presented in Table 1. The biochemical analysis of the oral fluid in children with TMJ disease showed an increase in the activity of elastase in the oral fluid. During the study, the level of antimicrobial protection was studied by the content of lysozyme in the oral fluid, the results are summarized in Table 1. The table data indicate that in children with TMJ disease, the activity of lysozyme in the oral fluid was 2.4-3 times less than in children without somatic diseases. The state of antimicrobial protection in the oral cavity was also assessed by the activity of urease in the oral fluid, which is produced by pathogenic and conditionally pathogenic microflora. The results of the study of urease activity in the oral fluid in children with TMJ pathology and practically healthy children are presented in Table 1. As can be seen from the presented research results, the activity of urease in the oral fluid of children with TMJ pathology was on average 2 times higher than this indicator in healthy children (P<0.05). Thus, a decrease in catalase activity and a high content of MDA in the oral fluid in children with TMJ pathology indicated a violation of the reserve capabilities of the antioxidant system and an intensification of the processes of lipid peroxidation in the oral cavity. In children with TMJ pathology, there was a significant decrease in the content of lysozyme in the oral fluid and a simultaneous increase in urease activity relative to the data of practically healthy children. This indicates that in children with TMJ disease, there was a decrease in the level of antibacterial protection of the oral fluid, as a result of which the degree of contamination of the oral cavity with pathogenic and conditionally pathogenic microflora increased.

The obtained results of clinical and laboratory research dictate the need to develop rational preventive measures that will accompany the treatment of children with TMJ disease.

Thus, in children with TMJ disorders observed imbalance in prooxidant-antioxidant system (a decrease of catalase activity and increased the level of malondialdehyde, reduced antimicrobial protection and the increase of the degree of contamination of pathogenic and conditionally pathogenic microflora.

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