STRUCTURE AND PREVALENCE OF DENTAL AND JAW ANOMALIES AND DEFORMATION IN CHILDREN DURING MIXED OCCLUSION PERIOD IN EXTREMELY CONTINENTAL CLIMATE

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Abstract. The structure and prevalence of dental and jaw anomalies and deformation were studied in children aged 6-12 living in extremely continental climate in Zabalkalye. High prevalence of dental and jaw anomalies was revealed, with distal occlusion and maxillary deformation being wide spread. Main etiologic factors contributing to prognathic occlusion develop-ment were determined.

Key words: prevalence of dental and jaw anomalies, mixed occlusion formation, sagital occlusion, children aged 6-12.

Dental and jaw anomalies occupy a leading position among the diseases of the maxillofacial area. According to E. Udovicki (2003), functional and morphological variations were found in 75% of children aged of 3 years, and it exceeds frequency of caries and other dental diseases by occurrence. The data of the population epidemiological studies of several regions of Russia are quite contradictory and show great variability in the prevalence of dental and jaw anomalies in different regions, which ranges from 11,4% to 71,7% [2, 6, 7].

In the last 30-40 years there has been a tendency towards increase of the frequency of children dental and jaw anomalies. This is due to the fact that resistant pathological mechanisms affect its formation [5]. Obviously, the prevalence of dental and jaw anomalies can justifiably be regarded as one of the integral parameters characterizing the health status of children in a particular region. [4] Several authors assume that the increase of incidence is related to changes in environmental conditions: atmospheric air pollution, changes in the micro-and macro-element composition of drinking water [1]. Their conclusions are based on the inseparable connection of macro-and micro-organisms.

During the formation of mixed occlusion in children of 6-13 years there occurs intensive formation of dental, respiratory and musculoskeletal systems, neuromuscular regulation of organs and tissues [3, 8]. With the growth of the jaws and teeth change the formation of occlusion occurs [9].

The aim of our study was identification of the structure and the prevalence of dental and jaw anomalies, caries prevalence and its intensity in children with mixed occlusion, living in Chita town.

Material and methods of research. The subjects were divided into groups according to the period of dentition system development: group 1 - six to eight years (the period of initial mixed occlusion), 2 group - from nine to thirteen years (the period of late mixed occlusion). The total number of the surveyed was 660 people in each age group by 329 and 331 children. The subjects lived in districts with different content of fluoride in drinking water and the level of air pollution.

To determine the prevalence and structure of the dental and jaw anomalies the medical-geographical research methods proposed by the Central Research Institute of Dentistry (CRIS) were applied, with the scientific and practical guidance on the application of the dental and jaw anomalies epidemiological studies developed by the dental department at WHO headquarters and the dental diseases epidemiology Commission of International dental Association (Form WHO/IDA).

Estimation of oral hygiene in children had been identified by index of Volodkina and Fedorov (1971). The prevalence of dental caries and dental and jaw anomalies was determined as a percentage. To do this, the number of people with certain signs of dental caries or dental and jaw anomalies (except the local demineralization) was divided by the total number of examined in this group and multiplied by 100. The intensity of the caries process in the mixed occlusion period was determined by **КПУ+кп** index. In determination of the physical status dispensary cards f-113u and f-112u had been used.

The research results were treated by methods of variation statistics with calculation of the average values (M) and standard deviation (ð) and the error of the average (m). The reliability of differences of indicators of relevant research methods was determined by the Student's criteria. A value was considered statistically reliable if match the value of $p < 0,05$ in the table.

Results and discussion. The frequency of the dental and jaw anomalies is calculated as a percentage of the total number of children examined with the dental and jaw anomalies (table 1). The overall prevalence of dental and jaw anomalies in the initial mixed occlusion period was 66,3±3,5%, in the late period significantly higher rate 69,3±2,4% ($p < 0,01$) was observed. This

figure reveals a low rate of self-regulation of dental and jaw system, even in cases where functional disorders were the causative agent.

The distal occlusion takes the highest position in relation to other dental and jaw anomalies and averages 25,5±1,9 and 34,4±1,3% ($p<0,01$). Continental climate influence on the overall physical health of children is confirmed by the analysis of physical cards. If during the period of temporary occlusion the surveyed patients had conservative treatment for adenoids, than in mixed occlusion period 37,4% underwent surgery - **adenoektomy**. Nasopharyngeal tonsil hypertrophy contributes to a gothic palate formation, short-cut dentitions and lengthening of the frontal section of upper jaw, so that there is a formation of two types of distal occlusion: the frontal shape and combined with distalization of the mandible and the relation of the teeth of the second class by Engle.

Table 1

The frequency and structure of the dental and jaw anomalies and the prevalence of dental caries in children mixed occlusion period (M±m)

Studied periods of dental and jaw system development	Initial mixed occlusion (6-8 years); (n=329)	Late mixed occlusion (9-13 years); (n=331)
The overall prevalence of dental and jaw anomalies (%)	66,3±3,5	69,3±2,4**
Prognathic occlusion (%)	25,5±1,9	34,4±1,3**
Mesial occlusion (%)	6,4±0,8	4,3±1,2**
Deep overbite with deformation of dental rates (%)	19,1±1,1	14,9±1,4**
Open occlusion (%)	14,9±1,4	5,8±1,1***
Oblique, cross occlusion (%)	20,2±0,9	7,4±0,9***
Anomalities of individual teeth and dental rates (%)	13,9±1,1	33,2±1,4***
Early loss of temporary teeth (to the physiological changes over the year) (%) / loss of the permanent teeth	21,5±1,4	11,3±2,1***
Caries prevalence (%)	70,2±1,8	58,3±1,7***
The median of caries intensity	5,0±0,8	4,2±0,1**
Hygiene index according to Fedorov-Volodkina	2,63±0,4	2,08±0,1**

*Note. * relevant difference between periods of dental and jaw system development, where * $p < 0,05$; ** $p < 0,01$; *** $p < 0,001$*

Mesial occlusion in the first period of mixed occlusion was 6,4 %, 4,3% in the second . It should be noted that the true shape of mesial occlusion, which has in its etiology genetic predisposition to the excessive development of basis mandible was detected only in 1,4% of cases. 98,6% consisted of two forms of mesial occlusion - a false front mesial occlusion and constrained mesial occlusion.

Frequent colds induce not only the development of distal occlusion, but also because of the mouth breathing and hypotonus of circular muscles of the mouth – open occlusion. This figure was in the initial mixed occlusion 14,9±1,4%, in the late mixed occlusion 5,8±1,1% ($p < 0,01$). Decrease in the proportion of this disease is concerned with a reduction in the nasopharyngeal tonsil in given age aspect or held adenoectomy. Infantile type of swallowing as one of the etiological factors of a given nosology was detected in 2,8% of cases.

Deep occlusion with the deformation of dental rates in the period the initial mixed occlusion

was 19,1±1,1%, in the generated constant occlusion 14,9±1,4% ($p < 0,01$).

Transversal anomalies of occlusion are due, primarily, to delay of physiological abrasion of temporary canines, by completion of the physiological changes of the teeth group tended to decrease performance. In the first period of the initial mixed occlusion the rate of oblique and cross occlusion was 20,2±0,9%, in the period decreased to 7,4±0,9% ($p < 0,01$). Early loss of temporary teeth during the initial mixed occlusion was 21,5±1,45%, in the period of generated occlusion was 11,3±2,1% ($p < 0,01$). Despite the quantitative decrease in this indicator, its share in the second period is higher because in 38% of cases first permanent molars were removed, which are the keys to permanent occlusion.

The prevalence of dental caries in the second period has a tendency to decrease due to the physiological changes of temporary teeth affected by caries. This figure at the age of 6-8 years was 70,2±1,8%, and in 9-13 years – 58,3±1,8% ($p < 0,001$). The average intensity rate of caries also had lower values in the second period due to the physiological change of teeth 4,2±0,1 towards to the first period of 5,0±1,7 ($p < 0,01$).

The valuation of hygienic condition in the first period corresponded to 2,63±0,4 – «bad» , the second 2,08±0,1 ($p < 0,01$) - "satisfactory" state of oral health. The motivation for the care of a cavity for 9-13 years significantly increased.

Conclusion. The results of the derived data indicate a high prevalence of children dental and jaw anomalies and dental caries during mixed occlusion period. Moreover, among children of 6-13 years there are revealed a high proportion of sagittal anomalies – 34,4% and hypoplasia of the jaw bones in the second period which are leading to the influence of climatic and geographical features of Zabaikalye. It is established that children living in Chita town, suffer acute respiratory infections for at least 3-4 times a year. Nasopharyngeal tonsil hypertrophy is a leading etiological factor in the deformation of the upper jaw and distal occlusion development.

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