

Dental status of children with cleft lip and palate of preschool age

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Abstract. Children with cleft lip and palate are exposed more often to dental caries, noncaries dental problems, parodontium tissue diseases, dentoalveolar anomalies and other diseases. Long-term wearing of orthodontic appliances by such children often results in their unsatisfactory oral hygiene. They need treatment of dental disorders and recovery of respiratory, swallowing, mastication and speaking functions from an early age. Despite the comprehensive development of a complex of rehabilitation measures taken for children with cleft lip and palate, oral cavity sanitation, and prevention of caries and periodontology among such children leave much to be desired and require in-depth study.

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Introduction

Cleft lip and palate is one of the most widespread abnormalities of human organs. The availability of congenital pathology causes not only cosmetic anomalies and related social issues of the child's adaptation in the community but also conditions the increase in spread and intensity of dental disorders of oral cavity (dental caries, periodontology, dentoalveolar anomalies). Especially high increase in the spread and intensity of dental caries has been noted in children with cleft lip and palate from 2 to 5 years of age. Moreover, dental caries was mainly determined on supermaxilla on the side of location of cleft and in the first temporary molar teeth [1,2,3]. Although most of researchers consider a complex approach at implementation of rehabilitation measures for children with cleft lip and palate as necessary, oral cavity sanitation and prevention of caries and periodontology among such children leave much to be desired and require in-depth study [4,5,6,7]. The purpose of the study – to study dental status of children with cleft lip and palate.

Material and methods

In the South-Kazakhstan Rehabilitation Center for children with congenital and genetic defect of maxilla-facial area, dental status was studied in 90 patients. They were from 1 to 6 years of age. The studies were held during the first visit of the child to the clinic. The questionnaire "Evaluation of the Child's Dental Status" that we compiled, including

the following sections, was completed for every child:

1. Status of facial tissues and organs,
2. Status of respiratory, swallowing, speaking, and mastication functions,
3. Oral hygiene status,
4. Dental health,
5. Status of dentition,
6. Availability of orthodontic appliance,
7. Orthodontic treatment needs
8. Other treatment needs.

In order to identify the spread and intensity of caries, the generally accepted indices were used ("cf", "cf+ CFE"), as well as noncaries dental lesions were studied [8].

In order to assess the severity of gingivitis, PMA index (papillary marginal alveolar index) was determined by way of staining gingiva with Lugol's solution. The method is based on interaction of glycogen formed at inflammatory processes in gingival tissues, with iodine. Depending on duration of inflammatory process, gingival tissues acquired yellow-brown colour of various intensity. Papillitis (P) was appraised by 1 point, gingival margin inflammation (M) – by 2 points, alveolar gingiva inflammation (A) – by 3 points [8].

The dental health level was determined by P.A. Leus's method [9]. For this purpose, according to the method, a code from 1 to 9 was assigned to every disease, depending on severity. In order to identify the dental health level, the largest code value

was selected from among all codes at the end of the examination. The health level was identified according to the scale of "code values" in percent: 1=90%; 2=80%; 3=70%; 4=60%; 5=50%; 6=40%; 7=30%; 8=20%; 9=10%.

The hygienic index (HI) was determined by Yu.A. Fyodorov's and V.V. Volodkna's method [8]. Oral hygiene status was considered as good (optimal care) at HI value = 1.1 – 1.4 point, as satisfactory – at HI value = 1.4-1.8 points, as unsatisfactory – at HI value = 1.9-2.5 points. Oral hygiene status was considered as bad or very bad at HI value = 2.6 and more that indicated impairment of regular teeth and mouth care.

The results of the study were subjected to statistical processing according to the generally accepted methods with the use of the Student criteria. M, m, t, and P values were determined. Differences were deemed valid at $P < 0.05$.

Results and discussion

The data of Ye.K. Ormanov were taken as dental status indicators in virtually healthy children [10]. The moderate spread of dental caries with virtually healthy children of preschool age was revealed mainly at the expense of high spread of temporary dental caries. Permanent teeth are affected with caries for the first time in preschoolers, starting from 5 years of age. 3.4% of virtually healthy children of preschool age showed hypoplasia of temporary teeth enamel. Periodontology, mainly gingivitis, was revealed in 9.7% of the examined.

The main reason is unsatisfactory oral hygiene status. Minor dentoalveolar anomalies (anomalies of teeth positions in 15.8%) were revealed in virtually healthy children of preschool age. The dental health level in virtually healthy children made up 93.4%.

In children with cleft lip and palate, dental caries at the preschool age is one of the widespread diseases that were revealed on average in 73.7±6.10% of the examined. The caries process intensity was equal to 3.9±0.86, being definitely higher than in virtually healthy children of the same age. It has been established that with age the spread and intensity of caries in children with congenital pathology have a tendency to increase. If at the age of 2 years such indicators made up 21.3±5.02% and 3.7±0.21, then at the age of 6 years they made up 95.3±5.34% and 4.9±0.26. Especially abrupt increase in the spread and intensity of dental caries has been noted in children from 4 years of age (Table 1).

Table 1 - Spread and intensity of dental caries in healthy children and in patients with cleft lip and palate (M±m)

Age of children (in years)	Spread (%)		Intensity (cf, cf+ CFE)	
	Healthy (n=154)	Patients (n=90)	Healthy (n=154)	Patients (n=90)
2	12.5±8.76	21.3±5.02	0.13±0.23	3.7±0.21
3	53.2±3.23	75.5±8.27	2.80±2.80	3.9±0.96
4	59.9±2.34	91.2±5.43	4.10±0.22	4.8±0.78
5	67.9±1.62	85.2±6.41	4.30±0.23	5.9±0.29
6	74.8±2.45	95.3±5.34	3.04±0.23	4.9±0.26
M±m	53.7±3.68	73.7±6.10 **	2.87±0.74	3.9±0.86 **

* Difference in results is statistically valid ($P < 0.001$) as compared to indicators of virtually healthy children.

Children with congenital pathology had prevailing sub compensated and decompensated disease forms, whereas compensated form of dental caries was revealed more often in healthy children.

Of noncaries lesions in hard tissues of teeth, 14.2% of children with cleft lip and palate of preschool age showed hypoplasia of temporary teeth enamel, being 4 times higher than in healthy children.

Thus, children with cleft lip and palate are highly exposed to dental caries that proceeds more actively than in healthy children. It is explained by the fact that children with such nosology are often exposed to respiratory and other somatic diseases; there are difficulties in arrangements for feeding in postoperative period. Long-term wearing of orthodontic appliances and impairment of oral hygiene are risk factors for decompensated course of dental caries. Thus, children with cleft lip and palate, in the period of dispensary observation, alongside with a complex of measures aimed at removal of the congenital defect, require medical and preventive measures, facilitating normal teeth maturation and increasing their resistance to caries.

When appraising the status of parodontium tissues of children with cleft lip and palate, gingival edema and hyperemia were revealed. At evident inflammatory process, bleeding gums were noted, especially in children with unsatisfactory oral hygiene (HI = 2.49 ± 0.24), at long-term wearing of orthodontic appliances, at availability of multiple dental caries, overcrowding, and abnormal teeth position. Bleeding gums were noted from the age of 3 years. On average, gingivitis was identified in 52.1% of children with cleft lip and palate.

Among children with cleft lip and palate, as compared to healthy children, high spread of dentoalveolar anomalies was revealed. If in virtually

healthy children, of dentoalveolar anomalies, abnormal teeth positions were mainly noted, and in children with the congenital pathology both abnormal teeth positions and dentition and occlusion anomalies were revealed.

All examined children with the congenital pathology showed abnormalities in number of teeth (adentia – in 93.3%, accessory teeth – in 6.7%). 91.7% of children showed abnormal teeth positions (in 56.7% - vestibular, in 31.7% - oral, in 3.3% other positions). Overcrowding of teeth in supermaxilla made up 53.3%, diastema was revealed in 46.7% of patients. Abnormal position of certain teeth was mainly determined in anterior area of supermaxilla on the side of location of cleft.

Of tooth row anomalies, with cleft lip and palate, narrowing, flattening, shortening, and asymmetry of supermaxilla dentition, of occlusion anomalies – protrusive occlusion, nonocclusion, and cross occlusion were identified.

In particular, in all examined children with the congenital pathology, supermaxilla narrowing was determined (100 %), in 8.3% - submaxilla narrowing was determined. The following abnormalities of the upper row shapes were revealed in cases as follows: V-shape – in 3.3%, trapezoidal – in 1.6%, triangular – in 48.3%, saddle shaped – in 21.7%, asymmetric – in 25%. No saddle shaped and asymmetric deformations were identified on submaxilla. V-shape was identified in 41.7%, trapezoidal – in 1.6%, triangular – in 48.3% of the examined.

Thus, all forms of abnormalities were observed on supermaxilla, with triangular and asymmetric shapes prevailing. V-shapes and triangular shapes were observed mostly on submaxilla.

Occlusions in children with cleft lip and palate in sagittal plane were identified according to the ratio of second temporary molar teeth. The results showed that in patients the contact of second temporary molar teeth in 68.3% of cases had correlation with distal grade, in 16.7% - with mesial grade, and in 15% of cases the correlation of molar teeth was in one plane.

At determining occlusion in children with cleft lip and palate in vertical plane, in the anterior area of dentition vertical incisal disocclusion was identified in 11.7% of patients. Straight incisal occlusion was determined in 16.7%, deep incisal occlusion – in 68.3%, deep incisal disocclusion (traumatic) – in 3.3% of patients. In posterior area, disocclusion on the side of cleft was observed in 66.7%, on the healthy side – in 23.3%. Only in 6(6/7 %) children no disocclusion was identified.

At determining occlusion in children with cleft lip and palate in transversal plane in the anterior area of dentition transversal incisal occlusion was identified in 86.7% of patients, in the remaining 13.3% - transversal incisal disocclusion. In posterior area, in 90% of cases there occurred palate occlusion on the side of cleft and in 10% of cases - palate occlusion on the healthy side.

All children with cleft lip and palate who visited the polyclinic for the first time needed orthodontic care in pre-operative period. Of them, 85% of patients needed remedial surgical procedures for soft facial tissues and oral mucosa. 36.7% required removal of temporary teeth for orthodontic indications. Due to various functional disorders, 83.3% of children with such pathology needed recovery of respiratory, swallowing, speaking, and mastication functions. The dental health level in children with cleft lip and palate was low and made up 35.4%, being 2.6 times lower than in virtually healthy children of the same age.

Conclusion

The study of dental status of children with cleft lip and palate has revealed high spread of dental disorders and dentoalveolar anomalies. In all examined children, oral hygiene was extremely unsatisfactory, and various anomalies of dentition, ranging from minor (abnormalities of teeth quantity and positions) to severe forms (occlusion abnormalities) were revealed. As concerns various functional diseases, children with such pathology need recovery of respiratory, swallowing, speaking, and mastication functions. Because of low dental health level children with cleft lip and palate require regular medical and preventive measures on improving dental health 3-4 times a year.

1. In children with cleft lip and palate of preschool age dental caries were revealed in $73.7 \pm 6.10\%$ of the examined with the intensity 3.9 ± 0.86 , being definitely higher ($P < 0.05$) than in virtually healthy children of the same age. Moreover it has been established that with age the spread and intensity of caries increase (at the age of 2 years - $21.3 \pm 5.02\%$ and 3.7 ± 0.21 , at the age of 6 years - $95.3 \pm 5.34\%$ and 4.9 ± 0.26 , correspondingly).

2. 14.2% of children with cleft lip and palate of preschool age showed hypoplasia of temporary teeth enamel, being 4 times higher than in healthy children.

3. Bleeding gums were noted in children with cleft lip and palate from the age of 3 years. On average, gingivitis was identified in 52.1% of the examined, being 5.4 times higher than in virtually healthy children. The main reason is unsatisfactory oral hygiene ($HI = 2.49 \pm 0.24$), long-term wearing of

orthodontic appliances, availability of multiple dental caries, overcrowding, and abnormal teeth position.

4. All children with cleft lip and palate showed abnormalities in number of teeth (adentia – in 93.3%, accessory teeth – in 6.7%). 91.7% of children showed abnormal teeth positions (in 56.7% - vestibular, in 31.7% - oral, in 3.3% other positions). Overcrowding of teeth in supermaxilla made up 53.3%, diastema was revealed in 46.7% of patients.

5. All children with cleft lip and palate needed orthodontic care and oral cavity sanitation in pre-operative period. 85% of patients needed remedial surgical procedures for soft facial tissues and oral mucosa. 36.7% required removal of temporary teeth for orthodontic indications. As concerns various functional disorders, 83.3% of children with such pathology needed recovery of respiratory, swallowing, speaking, and mastication functions.

6. The dental health level in children with cleft lip and palate was low and made up 35.4%, being 2.6 times lower than in healthy children of the same age. Therefore such children require regular medical and preventive measures on improving dental health 3-4 times a year.

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