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OPTIMIZATION OF COMPREHENSIVE NEUROSTOMATOLOGICAL CARE FOR CHILDREN WITH CONGENITAL CLEFT OF THE UPPER LIP AND PALATE

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Abstract:

Many scientists consider CCLP (congenital cleft lip and palate) to be a polymorphic disease that has a detrimental effect on the psyche and motor skills of a child. They approach the study of CCLP as a polymorphic defect that affects the overall motor and mental development of a child. The aim of the work was to determine the diagnostic value and the relationship of CCLP with neurological changes and to develop an integrated approach to timely diagnosis. The intellectual level of children with CCP (congenital cleft palate) was checked by experimental psychological testing using a color version of the Raven matrix. Testing was performed in 60 patients with cleft lip and palate (CCP) and in 16 patients from the control group. Conducted psychological testing using the Raven matrix found that no children with high or even above average IQ levels were found in patients with RNA.

Keywords: congenital cleft of the upper lip and palate, intellectual Raven test, intelligence coefficient

The relevance of the topic. CCP accounts for 30% of all malformations, and of the maxillofacial region is observed in 86% of situations. In the last decade, according to WHO, the birth rate was 1:750 newborns on average. [6,7,18]. Congenital anomalies from birth to adolescence, being an aesthetic and functional process, inevitably lead to disability. To the complexity of the problem of this category of children is added the high prevalence of concomitant diseases: ENT organs, respiratory, cardiovascular and central nervous systems and gastrointestinal tract.

Many scientists consider CCLP to be a polymorphic disease that has a detrimental effect on the psyche and motor skills of a child. They approach the study of CCP as a polymorphic defect that affects the overall motor and mental development of a child. In view of the early pathogenic factor affecting the emerging vital systems that impair important abilities: nutrition, respiration, speech perception and speech production [8,15,16,18]. The infancy period is considered an active age of development for establishing the psychology of speech development of children with CCP, however, there is practically no data on the pre-speech period and the system of correctional and pedagogical work [15,16,17,18]. The characteristic of the unity of perception and motor processes makes up the general motor skills and coordination of movement

The aim of the work is to determine the diagnostic value and the relationship of CCP with neurological changes and to develop an integrated approach to timely diagnosis.

Materials and methods of research. The clinical and neurological study included a study of the functions of the cranial nerves, a study of the motor and sensory spheres, an assessment of cognitive functions and the autonomic nervous system according to a generally accepted method among 80 patients. The study of the motor sphere consisted in determining muscle strength and tone, while motor activity was assessed on the MRS (Modified Rankin Scale) scale.

In order to objectively assess the damage to the nervous system, it is advisable to use psychological testing. One of these testing methods is testing using the Raven matrix (intelligence test). The Raven matrices (PMR) are progressive and serve as an adequate tool for identifying genetic and environmental facts of intellectual dysfunction. Matrices are theoretically justified, interpreted unambiguously, and their use is extremely simple, both for conducting and processing results. PMR can be used both in laboratory conditions and for extensive mass examinations at home, in schools, at work and in limited time conditions. In particular, the color version of PMR is intended for examination of children from 5 to 10 years old, although it is possible to use them for older children with abnormal development.

The intellectual level of children with CCP was checked by experimental psychological testing using a color version of the Raven matrix. Testing was performed in 60 patients with cleft lip and palate (RGN) and in 16 patients from the control group.

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The color version of the Raven intelligent test consists of three series: A, AB and B, each series includes 12 matrices. When performing the test, the examinee must complete the missing part of the image on the matrix. Different thought processes are implemented in each series of the test:

Series A: In this series, the subject must identify the relationships between the main elements of the structure and identify the missing part of the image by comparing it with the presented samples.

The AB series: In the process of solving tasks in this series, the subject analyzes the shapes of the main image and collects the missing figure, which requires analytical and synthetic mental activity.

Series B: In this series, working with the presented matrices, the observed correlates, searches for similar shapes to each other, identifies similar elements, and directly differentiates differences.

Together with orthodontic devices, a specially designed device was used to normalize the position of the tongue to eliminate the vestibular position of the molars. For children with CCP, a plate device for the dentition of the upper jaw was used. Active vestibular arches were placed in the lateral segments, freeing the palatine surfaces of the molars from the base by 2-3 mm to allow their rotation in the transversal plane. Massage elements were added to the lateral surfaces of the base on both sides to limit the pressure of the lateral surfaces of the tongue on the molars (see Fig. 1).

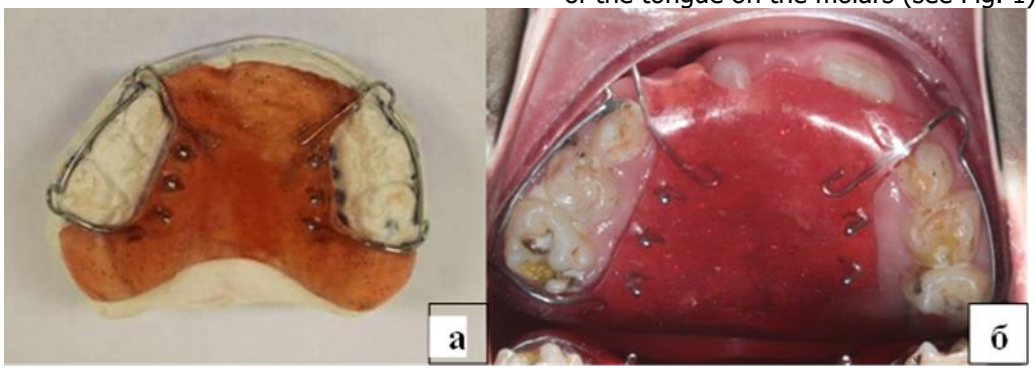

Fig. 1 Apparatus for eliminating vestibular inclination of molars: a. Appearance of the device; b. Device in the oral cavity.

THE RESULTS AND THEIR DISCUSSION. In order to diagnose the effect of the tongue on the progression of maxillary deformity, patients who had not previously received orthodontic treatment were included. An external examination of the face (full face, profile) established the signs characteristic of upper retro micrognathia, noted in all patients. A concave face was found in 21 (25%) patients, 26 (31%) children had an increase in the lower third of the face, while a straight profile was found in 42 (51%) children.

The following features were found in the process of functional assessment:

- chewing disorders in 28 (35%) children;
- nasal breathing disorder in 37 (46%);
- speech impairment in 35 (41%) people;

The dysfunction of nasal breathing was caused by a violation of anatomy: such as the curvature of the nasal septum and the large size of the lower nasal concha. Additionally, in some patients, habitual breathing through the mouth was recorded, associated with shortening of the upper lip after a surgical procedure (Fig.2).

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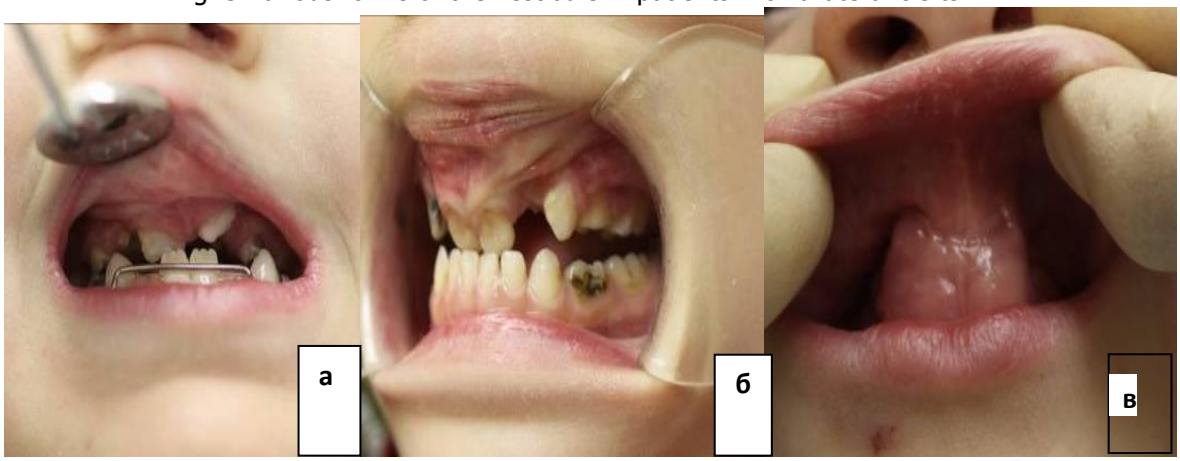
Fig.2

During a local examination of the oral cavity, emphasis was placed on identifying signs that can lead to the formation of secondary deformities on the jaws, namely, a reduced depth of the vestibule of the mouth or its absence at all due to noticeable scarring changes, the frenulum of the tongue and the high dome of the palatine vault were visible (Fig. 3).

Fig. 3 Various forms of the vestibule in patients with bilateral clefts:



Local examination provided:
- pronounced scarring in the oral cavity of the very vestibule in 10 (12%) patients;
- reduced vestibule on the upper jaw in 22 (27%) kids;
- small frenulum of the tongue in 3 (4%) children;
- a flat dome of the palatine vault in 19 (24%) persons.

More than half of the children and adolescents in our sample made mistakes in tests aimed at studying intellectual processes. However, the nature of the errors during the task was associated with fluctuation of attention and impulsivity. A third of the patients had a reduced task completion rate.

The comparison of the indicators obtained during the Raven color matrices was carried out according to the median of the results of the corresponding age. As can be seen from the diagram (Fig.4), a significant ($P<0.05$) decrease in IQ values was revealed in school-age children with CCP. It was found that adolescents with PMDD showed low IQ numbers on average, compared with the control group, and on average their IQ index

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was 17.8 ± 1.3 points, and in KG it corresponded to 22.4 ± 1.7.

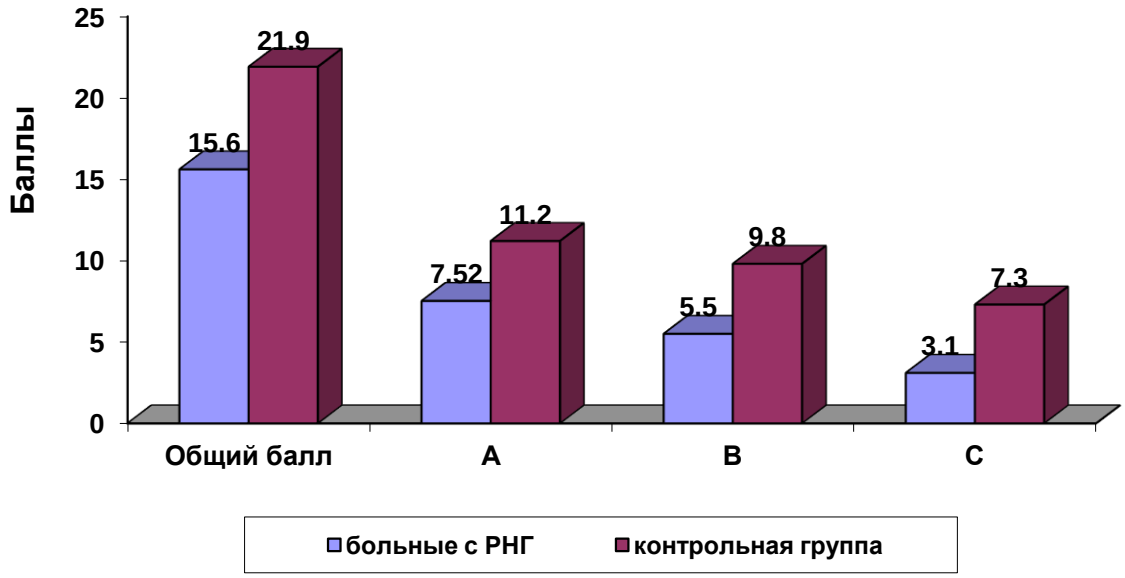

Fig.4 IQ level according to the results of the Raven's Progressive Matrices test in children with CGD.

More than half of the children and adolescents in our sample made mistakes in tests aimed at studying intellectual processes. However, the nature of the errors during the task was associated with fluctuation of attention and impulsivity. A third of the patients had a reduced task completion rate.The comparison of the indicators obtained during the Raven color matrices was carried out according to the median of the results of the corresponding age.

The examined children with RNG, performing tasks from series A, collected an average value of 7.83± 0.2 points, against 12.3± 0.2 points per KG, which is 1.5 times higher (P<0.05). The result of checking the data obtained as a result of the testing experiment explains the fact that subjects with HRNG have difficulties with differentiated skills in identifying the relationship between the elements of the task, inconsistency in supplementing the missing parts according to the sample.

The tested children with CCP, performing series B, found it difficult to find analogues among the curly drawings and could not determine their differences, the average score in the main group was 5.5± 0.85, which is almost 2 times less than the data of the control group (9.8± 0.6 points; P< 0.05).

The principle of the series C is to find the difference between the figured images in the vertical and horizontal aspect, which is what the examined children need to do. This task in children with CCP showed that the average score was 3.1± 0.5, which is 2.2 times lower than in children in the control group (7.3± 0.6 points).

Conducted psychological testing using the Raven matrix found that no children with high or even above average IQ levels were found in patients with RNA. In 74% of cases, he showed an average level of intelligence indicators and only 22% of cases (12 children) were below average, low IQ was found in 4 children (5%) (Table 1).

Table 1

Характеристика уровня интеллекта IQ пациентов с РНГ (n=76)

Группы	Высокий уровень, 121-140 балл		Выше среднего, 111-120 балл		Средний уровень, 91-110 балл		Ниже среднего, 81-90 балл		Низкий уровень, 71-80 балл		Легкая степень слабоумия, 51-70 балл	
	N	%	N	%	n	%	N	%	n	%	n	%
РНГ(n=60)	0	0	0	0	45	74	12	22	4	5	0	0
Контр. гр (n=16)	5	31,3	5	31,3	6	37,5	0	0	0	0	0	0

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For patients, it is difficult to solve even simple similar shapes, the ability to complement an asymmetrical figure to the whole stage is poorly developed.
The results of the obtained picture emphasize the average or low differentiation of the analysis and synthesis of visual function, it is difficult to find and identify analogies among figure pairs, underdevelopment of analytical-synthetic and mental functions.
Lack of self-criticism, lack of adequacy to evaluate the results negatively affects the result of assimilation of mental activity. The poorly developed possibilities of visual analysis, the activity of the analytical and synthetic sphere, undoubtedly show the low success rate of primary school education, as well as difficulties especially in learning writing and reading skills.
In the main group, 7 (33.3%) patients showed sagging of the soft palate and deviation of the uvula, however, swallowing and pharyngeal reflex were preserved in almost all patients.
Speech dysfunction was noted in 18 (82.0%) children of the main group: isolated dysarthria – 6 (24.5%), isolated dysophonia-3 (14.3%). The most severe changes in the speech flow, representing the bulbar speech syndrome - noticeable dysarthria in combination with the pathology of sound power (naso-and dysphonia). Delayed speech flow was less common in 3 (14.3%) children, but there were 9 (42.9%) patients with chanting speech. The severe degree of speech disorders was found more in patients of the youngest age, where the average age was 9.7+2.0 years. On the part of other cranial nerves (III, IY, Y, YI,YII pairs), neurological symptoms of mimic innervation were found rather less in children with RGN-perioral fasciculations – 6 (28.6%), hypomimia- 5 (23.8%), "fast and furious" facial expressions-3 (14.3%), facial asymmetry-2 (9.5%); weakness of the chewing muscles and/or deviation of the mandible were detected in 2 (9.5%); signs of oculomotor nerve dysfunction-strabismus and nystagmus - in 3 (14.3%) and 4 (19.0%), respectively. In some cases, changes in the sensory organs were noted: congenital hearing loss-2 (9.5%), congenital progressive myopia- 1 (4.8%).
According to the frequency of occurrence, violations of mimic innervation were in 2nd place in patients with RGN after the elements of bulbar syndrome.
In the main group, specific features of facial expressions in the form of hypomimia were more common, much less peculiar "forced" emphasized facial expressions were noted in 7 (33.3%) cases.
Thus, according to the results obtained, a kind of "neurological portrait" of a patient with RGN is compiled: specific elements of bulbar syndrome (mainly affecting the tongue muscle), features of facial expressions, facial and spinal (mainly from the cervical-thoracic region) dysraphism. Reaching a certain age, the severity of dysarthria and stem dysfunction decreases in the observed patients (from the III-IY pairs of cranial nerves), however, not quite severe speech dysphonia and/or nasophony persisted even in adult patients.
For older patients, the focus was on vertebral problems (back pain, radicular syndromes with recedivation, early degenerative changes of the spine) and dysfunction of the autonomic system. Such patients are treated by a neurologist, namely 6 out of 10 (60%) patients older than 11 years.
In 9 (42.9%) patients with RGN, in addition to the emphasis of cranial innervation, microfocal neurological symptoms were revealed, represented by elements of cerebellar syndrome (nystagmus, muscular hypotension, minimal coordination disorders) -4 (19.0%) patients, vegetative vascular disorders in older patients- 5 (23.8%) in patients aged 12 years. 2 (9.5%) had elements of akinetic-rigid syndrome

CONCLUSIONS

1. The causes of the development of damage to the nervous system in cases of VGN are congenital disorders of the central nervous system (63.5%), damaging psychological factors (62.5%).
2. Prognostically unfavorable factors in the treatment of pathology are comorbid and behavioral disorders, emotional disorders that contribute to the deterioration of clinical manifestations of VGN, aggravation of the long-term prognosis and a decrease in the effectiveness of basic therapy pathology.
3. These studies show certain changes in intellectual development in RNG, which is manifested in the weak formation of analytical and synthetic mental activity and the possibility of determining the level of intellectual development using tests, subsequent medication and pedagogical support for mental development.

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