Original Article

THE USE OF ORTHODONTIC APPLIANCES FOR THE CORRECTION OF MYOFUNCTIONAL DISORDERS IN THE PREVENTION AND TREATMENT OF DENTAL DISORDERS IN CHILDREN WITH CEREBRAL PALSY

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Abstract

The aim of the study was to determine the effectiveness of the use of orthodontic appliances for the correction of myofunctional disorders in the prevention of the treatment of dental disorders in children with cerebral palsy. During the clinical and anamnestic examination of 60 children with spastic forms of cerebral palsy, dental neurological status was assessed jointly by neurologists, dentists and psychologists from the city of Bukhara. In the formation of distal occlusion and deep incisal occlusion (disocclusion), functional disorders, in order to normalize the position of the tongue, in the presence of stereotypical habitual reactions and risk factors for the development of functional disorders, we used "Apparatus for correcting myofunctional disorders in children with cerebral palsy". The study revealed the need to develop and introduce into dental practice measures to prevent dentoalveolar disorders, taking into account the form and severity of cerebral palsy, as well as the age of the child. The study revealed the need to develop and introduce into dental practice measures to prevent dentoalveolar disorders, taking into account the form and severity of cerebral palsy, as well as the age of the child.

Keywords: apparatus for the correction of myofunctional disorders, children's central paralysis.

Introduction

According to the current ideas, shared by most scientists, paralysis cerebralis infantilis, cerebral palsy (ICP), is a group of central motor disorders (cortical-subcortical syndromes), in which acute and/or chronic exposure to an etiological factor (factors) occurs in the antenatal, perinatal and / or early neonatal periods of development, leading to brain damage and subsequent impaired development of predominantly motor spheres [6,12,18].

According to the SCPE (Surveillance of Cerebral Palsy in Europe) control group for cerebral palsy in Europe, the prevalence of cerebral palsy is increasing due to the survival of newborns with low birth weight and a higher degree of immaturity [14,17]. So, with cerebral palsy, the following anatomical structures are damaged: cortical, subcortical, brain stem structures. The functions of the body are disturbed: the functions of muscles, movements, food intake and then, the influence of which 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 that make the dentofacial complex unstable to physiological stress. For example, the formation of a motor stereotype, the formation of speech functions in a healthy child have their own patterns [3,15,7]. If in a healthy child babble is already sufficiently formed and the respiratory function is improving, then in children with

infantile central paralysis 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. It follows from this that motor disorders in children with central paralysis concern not only the limbs and trunk, but also the maxillofacial region [2, 4]. At the same time, in children with infantile central paralysis, the formation of motor functions is delayed and impaired, coordination of fine, differentiated movements is impaired, which proves the complexity of caring for the oral cavity of such children [1,13].

Cerebral palsy (CP) is one of the urgent medical and social problems, which is determined by its prevalence (3-5 per 1000 newborns) and disability of patients from an early age. Epidemiological data on the prevalence of dentoalveolar disorders in the population both in Uzbekistan and foreign countries indicate a clear trend towards their further growth [2, 3, 8]. Despite a significant number of works devoted to the clinical, neurophysiological, morphological and biochemical aspects of the pathogenesis of cerebral palsy and concomitant dental pathology, methods for correcting dentoalveolar anomalies in this category of children are insufficiently covered. At the same time, the diagnosis, prevention and treatment of dental diseases, including dental anomalies in children and adolescents with cerebral palsy, is an urgent problem due to the complexity of providing them with dental care due to the severity of the clinical manifestations of the underlying disease [5,9,11]. At the same time, a number of domestic and foreign studies indicate the need for early medical rehabilitation of children with spastic forms of cerebral palsy (CP) until they achieve optimal social adaptation, including normalization of muscle tone in the maxillofacial region [10,16,].

The aim of study was. Determination of the effectiveness of the device for the correction of myofunctional disorders in the prevention and treatment of dental disorders in children with cerebral palsy.

Materials and methods

Under observation were 60 people with the corresponding diagnosis at the age of 3 to 15 years before undergoing a course of rehabilitation and 10 months after the complex of treatment-and-prophylactic and rehabilitation measures. From the group of examined children, 15 patients with spastic diplegia constituted group I, 30 patients with hemiplegic form (right- and left-sided) - II, 15 patients with bilateral hemiplegia - III.

The examination was carried out at the bases of the Bukhara State Medical Institute of the city of Bukhara. During the clinical and anamnestic examination, the dental status was assessed together with neurologists, psychologists of the Center.

An electromyographic study of the superficially located muscles of the face (actually masticatory) was carried out using the multifunctional dental complex "Diastom". The results of the study were recorded in the form of electromyograms (EMG). Surface bipolar electrodes were used to record EMG.

In the course of a comprehensive dental examination, special attention was paid to the condition of the articulatory apparatus. In the formation of distal occlusion and deep incisive occlusion (disocclusion), functional disorders (swallowing disorder, weakness of the circular muscle of the mouth, tongue dysfunction, speech defects), in order to normalize the position of the tongue, in the presence of stereotypical habitual reactions and risk factors for the development of functional disorders, the Apparatus for the correction of myofunctional disorders in children with spastic forms of cerebral palsy.

This device consists of a lip bumper, an extraoral ring, which is fixedly connected to the outer surface of the lip bumper along the line of lip closure, a process of wire for fixing the bead, which is fixedly connected to the inner surface of the lip bumper, a bead, a bite pad, which is fixedly connected to the lip bumper, a visor on the incisors of the lower jaw, fixedly connected to the bite platform and three bends on the process for fixing the bead, located on each side. The design is made of medical hypoallergenic plastic.

The labial bumper should be located at a distance of 2.5-3.0 mm from the mucous membrane of the alveolar processes and dentition, thereby relieving the pressure of the soft tissues of the face on these areas, and in the region of the upper incisors it exerts slight pressure on them. The labial bumper should reach the distal surface of

the second primary molars or the first permanent and above the transitional fold by 2.0-4.0 mm, thereby stimulating osteogenesis in the area of the apical bases and promoting the growth of the jaws in width, as well as the growth of the alveolar process in the anterior region. mandible in the sagittal direction. The visor is placed at an angle of 40,00 – 45,00 in relation to the bite pad, its thickness is 3,0-4,0 mm. In this case, there is a slight separation in the lateral sections, which creates the possibility of vertical growth and provides an increase in the bite height, which allows the device to be used in the treatment of deep forms of occlusion and improve the functions of the temporomandibular joint.

With the help of an extraoral ring, the lower jaw can be moved forward, and during swallowing movements, the bead keeps the tongue in a physiologically correct palatal position. Thus, there is a restoration of myodynamic balance of the muscles of the oral region, as well as the normalization of the development and position of the lower jaw. The device is indicated during periods of milk and mixed dentition from the age of 3 for two hours during the day and during night sleep.

Results and discussion

In the structure of formed dentoalveolar anomalies (DNA), anomalies of individual teeth occurred in 15 cases (17.05%), anomalies of the dentition - in 9 cases (10.23%), anomalies of occlusion - 20 (22.73%), were separately identified combined AF (for example, anomalies of individual teeth and anomalies of dentition) - 44 (50.0%).

The structure of dentoalveolar anomalies in children, depending on the spastic form of cerebral palsy and the period of bite formation, is presented in Table 1.

Table 1 The structure of dentoalveolar anomalies depending on the spastic form of cerebral palsy M±m

Group	Statistical form of cerebral palsy	Anomalies				Neutral occlusion
		individual teeth	dental rows	Occlusions	Combined	
I	Spastic diplegia (n=15)	-	3,33±0,1 (n=1)	30,0±0,3 (n=9)	50,0±0,1 (n=15)	16,67±0,2 (n=5)
II	Hemiplegic form (n=30)	20,0±0,3 (n=12)	8,33±0,2 (n=5)	6,67±0,2 (n=4)	23,33±0,3 (n=14)	41,67±0,3 (n=25)
III	Double hemiplegia (n=15)	10,0±0,1 (n=3)	10,0±0,1 (n=3)	23,33±0,2 (n=7)	50,0±0,1 (n=15)	6,67±0,1 (n=2)

As can be seen from the data presented in the table, in children with spastic diplegia in the structure of dentoalveolar anomalies, combined dentoalveolar anomalies dominated with a significant predominance in the period of permanent occlusion. Of the anomalies of occlusion, distal occlusion, deep incisal occlusion, and deocclusion significantly predominated. Neutral occlusion occurred only in a small percentage of cases.

In children with hemiplegic form of infantile central paralysis, neutral occlusion occupied a significant position with a significant predominance during the periods of milk and mixed dentition. In subjects with double

hemiplegia, combined dentoalveolar anomalies predominated significantly in all periods of occlusion development, neutral occlusion occurred only in a small percentage of cases.

The period of adaptation to the device in the examined patients was successful within 3-4 weeks. However, in 10.0% of cases in children with severe spastic diplegia and in 20.0% of cases with severe double hemiplegia, a negative attitude towards the devices was observed in the form of unwillingness to use them and crying.

Difficulties in the organizational order were noted in 11,2%, namely, the recommendations for using the devices at home were not followed.

During the observation period (10 months), there was a positive trend in 43.8% of children of group II, namely, a decrease in the sagittal fissure in the anterior region to an average of 1.0 mm due to the growth of the jaws in the sagittal direction, in addition, the children sought to establish the lower jaw and tongue in a physiologically correct position, the myodynamic balance of the muscles of the oral region was also gradually restored, which affected the improvement of speech function (the amplitude of movements of the organs of the articulatory apparatus increased and the accuracy of their movements improved, as well as the pronunciation of some sounds). In children of group I, positive dynamics was noted in 25.5% of cases, in group III - dynamics was observed in a small percentage of cases.

The positive effect of the application of the utility model was to improve the results of the prevention and treatment of myofunctional disorders, increase the volume of pathogenetic effects with a minimum amount of orthodontic construction, improve the functional parameters of the dentoalveolar system in children with infantile central paralysis. When studying the functional activity of the masticatory muscles proper, an increase in their tone was revealed in the phase of physiological rest of the lower jaw in all age groups of the subjects. A tendency to an increase in the amplitude of the studied muscles with age has been established. When comparing this indicator within the groups, higher indices of the amplitude of the studied muscles were noted in children of group III. with severe movement disorders. The assessment of the amplitude of the biopotentials of the masticatory muscles proper in the examined children by groups of observations aged 6 to 15 years is presented in Table 2.

Table 2 The amplitude of the biopotentials of the masticatory muscles proper in children by groups of observations before and during the use of the device for the correction of myofunctional disorders (M±m)

Group	**Amplitude of biopotentials chewing muscles**	
	Before	After
I (n=**15)**	523,7±0,98*	514,3±1,55*
II (n=**30)**	507,4±1,15*	482,9±1,23*
III (n=**15)**	553,7±0,36*	549,2±0,41*

Note: * - p<0,001

Also, a tendency to a decrease in the amplitude of the biopotentials of the muscles under study was established with the regular implementation of a course of therapeutic and preventive measures according to indications.

Discussion

1. As a result of a comprehensive clinical and functional study of the dental and neurological status, data were obtained on the frequency, structure and dependence of dentoalveolar disorders in children with various clinical

variants of spastic forms of cerebral palsy, which must be used in practical healthcare for planning treatment and preventive work in rehabilitation centers.

2. To prevent the development of dentoalveolar anomalies in children with spastic forms of cerebral palsy, interdependence and mutual burden should be taken into account.

3. The used medical apparatus for the correction of myofunctional disorders in children with spastic forms of cerebral palsy can improve the results of the prevention and treatment of myofunctional disorders, thereby increasing the clinical effectiveness of the instrumental method for treating these disorders.

Conclusion

Thus, the study revealed the need to develop and introduce into dental practice measures to prevent dentoalveolar disorders, taking into account the form and severity of cerebral palsy, as well as the age of the child. In this regard, we used a medical device for the correction of myofunctional disorders in children with spastic forms of cerebral palsy, aimed at eliminating unfavorable etiological and pathogenetic factors in the development of dentoalveolar disorders in children with spastic forms of cerebral palsy.

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