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The Effectiveness of Early Orthodontic Treatment of Preschool Children with Distal Occlusion

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Relevance of the study. Anomalies of the maxillary system occupy one of the first places among diseases of the maxillofacial complex. The frequency of anomalies increases with each passing year of life. The most common anomaly of the maxillary system is distal occlusion of the dentition (DOSR). 75% of children have some form of malocclusion by the age of 12, of which 70% have distal occlusion of the dentition. According to E.V. Udovitskaya et al. (1983), functional and morphological abnormalities were found in 75% of 3-year-olds. In terms of prevalence, they exceed the frequency of caries and other dental diseases at this age. According to T.F. Vinogradova et al. (1987), among 3-year-old children, formed anomalies in the development of the maxillary system were detected in 48%. According to F.Y. Khoroshilkina et al. (1978), dental anomalies among the Russian child population occur during the period of temporary bite in 24%; 71% of preschool children with such disorders live in rural areas (Andrianova Yu.V. et al., 2004). It was revealed that in children with baby teeth, distal occlusion and deep incisor dysocclusion occupy one of the first places in terms of frequency (up to 42%). Distal bite is by far the most common pathology of the maxillary system, which occurs as a result of a violation of the relationship of the jaws in the sagittal plane. The most common distal bite is caused by retrognathia of the lower jaw. Correction of this pathology is most effective in early replacement bite. The effectiveness, stability of treatment, and prevention of relapses after treatment of distal occlusion is a complex and urgent task. Devices of a functional type of action are most effective both at the treatment stage and during the stabilization of the results obtained. This type of device is used to stimulate the growth and development of the lower jaw. Soft and bone tissues, according to the theory of functional matrices ("Funkswrnl Maike"), do not always have sufficient potential for growth, which leads to a delay in jaw growth. Myofunctional correction allows you to stimulate and normalize the development of the jaws. Correction of the position of the lower jaw occurs due to the normalization of synergistic and antagonistic muscles. One of these correctors is Myobrace (Myobraces, Australia). Devices of a functional type of action, which include this type of treated orthodontic devices, can be used as an independent method, as well as as the first stage before treatment with a fixed structure. One of the causes of distal bite is a violation of nasal breathing. Children with oral and mixed breathing have a bad habit - oral breathing. The tongue occupies a position behind the lower incisors, and the lower jaw begins to lag behind in growth. Due to the underdevelopment of the lower jaw, there is a violation of posture and the usual anterior position of the head is formed (pushing the head forward and tilting it) relative to the spinal column. As a result of the change in the load distribution, the curvature of the cervical spine occurs. The position of the hyoid bone changes, the position of the head in relation to the spine may change, and sometimes the shape of the vertebral column and chest may change. In order to correct the type of breathing in children, a comprehensive clinical approach is used: examination by an orthodontist and an otolaryngologist in order to establish and eliminate the etiological factor of nasal breathing disorders. In the absence of timely correction of the oral type of breathing in childhood, characteristic external signs are formed, such as: slightly open mouth, non-closing lips.; an elongated oval face or the so-called adenoid type of face, with an increase in the length of the lower third of the face, characterized by a dolichocephalic type of structure, a narrow nasal passage, narrowing of the upper jaw, and a violation of the overlap of the lower incisors with the upper ones. The degree of

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development of the topic. The prevalence of anomalies of the maxillary system is very high today. Dental anomalies occupy the second place among dental diseases, second only to caries. Along with morphological disorders of the maxillary system, most children have dental anomalies combined with functional problems. This requires the participation of several specialists in the correction of this pathology (pediatric dentist, orthodontist, otorhinolaryngologist). In the research of scientists from Russia, much attention is paid to the analysis of the prevalence and frequency of anomalies of the maxillary system, which include anomalies in the number, position and shape of teeth; violation of the shape and size of the dentition, the position of the jaws and the occlusion of the dentition itself. Data on the prevalence of anomalies of the maxillary system vary. A number of researchers believe that their highest frequency is observed in children aged 6-9 years. Most experts note their increase with age. So, at the age of 6, 56% of children have anomalies in the position of individual teeth, at the age of 9, 69% of children have anomalies in the position of individual teeth and 44% have anomalies in the shape of dental arches; by the age of 12, 90% of children have anomalies in the position of individual teeth and 58% have anomalies in the shape of dental arches. At the same time, children with pronounced malocclusion showed a high level of caries intensity, signs of periodontal disease were noted: bleeding gums when brushing teeth and eating harsh foods, as well as a low level of oral hygiene.

The most effective correction of anomalies of the maxillary system is during the period of milk and changeable bite. In this regard, it is necessary to diagnose malocclusion and dental position in early replacement bite. However, to date, the effect of removable distal bite correction devices on the volume of the upper respiratory tract has not been sufficiently studied. Recently, myofunctional devices have been actively used, but there is insufficient data on the possibility of using these devices in patients with a large incisor deviation in the sagittal plane. In recent years, there has been an increase in the prevalence of dental anomalies. In children and adolescents, ASF occurs in 30-75% of cases and tends to increase. In 30-55% of cases, orthodontic HIP correction is required, however, in patients aged 12, this figure increases to 70%. To date, distal bite is the most common anomaly in the ratio of dentition. The dental alveolar form of distal occlusion is observed in 63% of the examined, and the gnatic form in 37% of the examined patients. In children with temporary and early replacement occlusion, the incidence of distal occlusion ranges from 33.01% to 46,9% [6; 78; 129; 145]. Diagnosis and treatment of distal occlusion are among the urgent and complex problems of orthodontics. The term "distal bite" was introduced in 1926 by Benno E. Lischer. Currently, a distal bite is understood to mean a ratio of dentition in which the lower dentition occupies a distal position relative to the upper one, in which the ratio of the first permanent molars corresponds to class II E. Angel, the mesial buccal tubercle of the first upper molar is located anteriorly from the interlobular groove of the lower tooth of the same name. The distal bite is characterized by certain facial features: a bulge of the face, sometimes very sharp, often a shortening of its lower third, the upper lip is short, and the lower one is located behind the upper incisors, the lips often do not close, in many children the mouth is slightly open, the chin fold is pronounced. A tense facial expression and smoothness of its contours are observed when combining a distal bite with an open one. The direction of the upper lip depends on the inclination of the teeth and can be protruding (II class 1 subclass of anomaly) or flattened with the retraction of the front teeth or their absence (II class 2 subclass of anomaly). The first subclass is characterized by protrusion of the upper front teeth with the formation of a sagittal gap. In the second subclass, the morphological changes are more uniform. On external examination, the lips are closed, the lower lip is thickened, there is a deep chin fold, and the mandibular angles are close to right angles. The distal bite occupies the main part in the structure of anomalies in the ratio of dentition. The frequency of distal occlusion is unevenly distributed among the age groups of children. So in the early replacement bite 15.5%, in the late replacement bite 23.8%, in the permanent bite up to 43%. The most common distal bite is caused by retrognathia of the lower jaw. Most authors identify postnatal factors in the etiology of distal occlusion. An important role is played by: diseases of early childhood, artificial feeding, impaired respiratory function, and bad habits. In children aged 5-9 years, bad habits and impaired renal function are the most significant among the

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factors contributing to the formation of malocclusion. The main causes of the development of OCD include functional disorders: respiratory, speech, and chewing disorders. During an external examination, orthodontists record the presence of bad habits in children with distal bite. Bad habits are frequently repeated contractions of the muscles of the parotid region of the tongue, movements of the lower jaw, as well as habits related to the position of the body, the position of the lower jaw. As a result of bad habits (sucking a finger, pacifiers), a narrow lower jaw is formed, its posteriorly displaced, the position of the tongue changes, the oropharynx narrows, and apnea occurs. By the time the baby is born, the fetal mandible is displaced distally from the upper jaw, resulting in infantile retrogenia. This ratio of the jaws relative to each other and to the base of the skull facilitates the passage of the child through the birth canal of the mother. Natural feeding provides the act of sucking, which stimulates the chewing apparatus and translates retrognathia into orthognathia. Artificial feeding, unlike natural feeding, is not accompanied by tension of the muscles of the floor of the mouth, lips and intensive tongue work, which is an important factor in the development of the lower jaw. Thus, there is a delay in the displacement of the lower jaw anteriorly with respect to the upper and its stabilization in a neutral position. With a distal bite, chewing efficiency is reduced due to a decrease in the area of teeth closure, when grinding movements of the lower jaw prevail. The number and duration of the chewing period increase by an average of 30%. Patients with this diagnosis often have posotonic reflexes that determine an incorrect body position at rest, impaired posture, and stooping when walking. A pronounced backward displacement of the lower jaw can cause a narrowing of the upper respiratory tract and worsen sleep apnea syndrome. Narrowing of the upper respiratory tract, increased hypotension of the muscles of the tongue and pharynx, as well as skeletal abnormalities in the position and size of the lower jaw can cause obstructive breathing during sleep in children and adults. In 40% of patients with apnea syndrome, mandibular retrosion was detected. The cause of apnea may also be ENT pathology of the nasopharynx. The condition of the nasopharyngeal arch, the position of the root of the tongue and the soft palate are key in deciding on the tactics of eliminating obstructive sleep apnea.

Conclusion. There is also a correlation between OSA in children with the occurrence of neurocognitive insufficiency, with other pathological changes and cardiovascular diseases. A change in posture, in turn, causes changes in the tone of the neck muscles, which is the cause of abnormalities in the development of the lower jaw and the balance of the body in general. It was revealed that patients with distal occlusion have a habitual anterior extension of the head, an increase in the angle between the chin and neck, as well as significantly greater activity of the temporal muscles. The analysis of electromyography data from patients with distal bite and oral respiration indicates hypertonia of the temporal muscles, which is a consequence of the formed compensatory chewing. Functional muscle abnormalities have been established, which is the basis for morphological changes in the face and appearance of a patient with distal bite and oral breathing.

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