

Evaluation of Electromyographic studies of masticatory muscles in Children with Cerebral Palsy

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Abstract: *The authors detail a new method of EMG studies in children with cerebral paralysis. EMG provides benefits as a highly informative and reliable technique with the ability to visualize and determine the parameters of the investigated muscles electroexcitability dental-jaw apparatus in the diagnosis of dental-jaw anomalies among children with a cerebral paralysis.*

Keywords: *polyethological disease, stereotype, vicious postures, circular electrodes.*

Introduction.

The study of the functional state of the masticatory and facial muscles using various instrumental and technical methods is necessary in patients with anomalies of the dentoalveolar system [2,3,4,5,6,7]. Since the untimely treatment of such pathologies can lead to the formation of a pathological motor stereotype, vicious postures and contractures, especially in cerebral palsy (Sh.Sh. Shomansurov, K. S. Malikov, B. B. Baizhanov, 1982).

Infantile cerebral palsy (ICP) is a polyethological disease of the central nervous system, the leading symptom of which is motor disorders of the skeletal muscles [1,8]. One of the muscle groups is located in the maxillofacial region and participates in the acts of chewing, swallowing, speech and breathing.

Electromyographic examination of the muscular complex of the dentoalveolar apparatus is of great importance in functional dentistry [9, 10]. Electromyography (EMG) is a method for determining the functional state of muscles,

which consists in recording the bioelectric potentials that occur in the muscles at the time of excitation. It is used as a method of scientific and diagnostic significance, since it can be used to determine the contractile capacity of the masticatory muscles and the nature of excitatory-inhibitory processes in the muscles [10].

The method of electromyographic examination of the masticatory and facial muscles allows us to reveal the subtle processes of reconstruction of the dentoalveolar system in various pathologies, including HFA.

The aim of this study was to study the bioelectric activity of the masticatory, temporal and round muscles of the mouth in patients with diplegic cerebral palsy.

Material and methods of research.

26 sick children aged 6-13 years with diplegic form of cerebral palsy were selected for the electromyographic study.

The control group consisted of 17 practically healthy children with a normal bite.

Bioelectric activity was studied in both masticatory muscles (m.masseter), temporal muscles (m.temporalis) and round mouth muscle (m.orbicularis) in a state of physiological rest. A four-channel electromyograph of the company "Medicor" (VNR) was used at speeds of 50 and 100 mm/s.

Bipolar circular electrodes with an area of 5 mm² enclosed in plastic were used to record the biopotentials. Before applying the electrodes, the skin was treated with alcohol. The electrodes on the adhesive tape were fixed in the center of the

motor points of the temporal and chewing muscles themselves. The distance between the two electrodes was 10 mm.

The duration of the excitation threshold, the sensitivity of the muscles, as well as the frequency and amplitude of the sensitivity of the above-mentioned muscles on both sides were studied.

Results and discussion.

Studies have shown that in children of the control group in all three muscles, the indicators of the excitation threshold are higher than in patients with cerebral palsy.

When comparing the parameters of the excitation threshold, the asymmetry of the indicators is established. The duration of the excitation threshold on the left side is longer than on the right. And the amplitude of the excitation threshold is greater on the right side than on the left.

The sensitivity of the excitation threshold in the masticatory muscles is greater on the right side than on the left side.

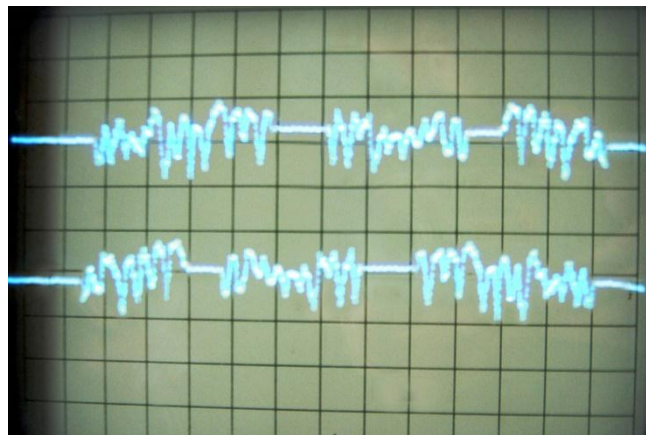
The analysis of the obtained results showed that in patients with cerebral palsy, the parameters of the excitation threshold slightly lag behind the parameters of healthy children.

In the diplegic form of cerebral palsy, despite the fact that the process propagates equally bilaterally, the parameters of the excitation threshold have a large difference interval.

Comparison of indicators of healthy children and those with diplegic cerebral palsy.

The study of the tone of the masticatory muscles showed pronounced and ambiguous deviations from the norm in all groups of subjects. In spastic diplegia, hemiparetic and hyperkinetic forms of the disease, children aged 6 and 12 years have an increased tone of the masticatory muscles in the phase of relative physiological rest of the lower

jaw, which indicates their excessive and constant tension. The preservation of increased tone in the



phase of relative physiological rest of the lower jaw in children during the bite of permanent teeth indicates the absence or insufficient improvement of the function of muscle relaxation in the process of formation of the dentoalveolar system.

In the hyperkinetic form of cerebral palsy, there was also a significant increase in the tone of the contracted muscles to 91.6 M in 6 years and 104 M in 12 years. In addition, the tone of the contracted muscles in children of this group was significantly higher than in other groups ($p < 0.01$).

In patients with atonic - astatic form of the disease in contrast to the subjects observed a decrease in the tone of the masticatory muscles, as in the phase of relative physiological rest ($54,6 \pm 5.1$ Metres in 6 years and 51.2 ± 2.0 M in 12 years) and in a phase of reductions ($62,1 \pm 4.9$ M and

$59,6 \pm 1.9$ M). In addition, the tone of relaxed and contracted muscles was lower in 12-year-old children compared to the data obtained in 6-year-old children of this group, which is explained by a violation of blood supply and the development of muscle atrophy in this form of the disease.

Conclusion

Thus, all the subjects were characterized by a significant decrease in the difference in the parameters of the tone of the contracted and relaxed muscles and, accordingly, the coefficient of contraction, which indicates a reduced ability of the neuromuscular apparatus to excitability and conduction and is a consequence of damage to the motor cortex in cerebral palsy. Indicators of the difference in contractile and plastic muscle tone in 6-year-olds were greater than in 12-year-olds, which indicates a decrease in the contractile ability of the masticatory muscles with age.

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