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Research Article

### INTERDISCIPLINARY APPROACH IN THE TREATMENT OF BRUXISM

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#### Abstract

*Problem of violation of the functional state of the masticatory muscles due to increased tension is an urgent problem of medicine. Prevalence of bruxism has a large variability - from 6 to 91%. The problem is multifaceted and affects not only the dental, but also the neurological component. The leading link in the pathogenesis of bruxism is the defeat of the neuromuscular synapse. A simple and effective method for the early diagnosis of bruxism can be portable surface electromyography.*

*Purpose of the study: Increase the effectiveness of the treatment of patients with bruxism by injecting botulinum toxin type A into the masticatory muscles.*

*Objectives: to evaluate the muscle relaxant effect and its duration with the introduction of botulinum toxin type A (neuroprotein) into the masticatory muscles under the control of surface electromyography. Muscle relaxation and reduction of pain intensity, which arise as a result of injections of botulinum toxin type A, leads to an increase in the volume of active movements of the masticatory system, and the activity and speed of the chewing movements performed.*

**Key words:** *Bruxism, parafunction, orofacial dystonia, electromyography, botulinum toxin type A, the masseter muscle.*

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## INTRODUCTION:

The problem of violation of the functional state of the masticatory muscles, due to increased tension, is an actual problem of medicine (Scott S., et al. 2013). This is due to both the multiplicity and ambiguity of complaints and symptoms, as well as the frequent involvement of the temporomandibular joint function and occlusion in the pathological process.

The prevalence of bruxism has a large variability - from 6 to 91%. A significant range of indicators is associated with the patients' lack of information about their nighttime parafunctional habits, and ways of identifying it are not always objective (Virgunova T., 2013, Liu and Steinkeler, 2013, Boykota, et al. 2013). This multifaceted problem affects not only the dental, but also the neurological component (Agranovich and Agranovich, 2011).

Bruxism defined as para-function, which realized in the form of compression and chafing of the upper and lower teeth among themselves. Extremely high forces in the pathological movements of the jaws can be several times higher than the normal chewing load on the dental system (Slavic and Sato, 2003).

One of the topical issues discussed in the dental community: can bruxism be a form of muscular dystonia and be regarded as a subclinical manifestation of orofacial dystonia or dystonic syndrome (Etzel et al., 1991, Frisardi et al., 2013, Golubev, 2002)? The latter point of view is the most convincing and supported by the association of bruxism and such dystonic syndromes as writing spasm, blepharospasm, dystonic tics, dystonic syndromes in families, the hyperexplection phenomenon typical for dystonic patients. This thesis also supported by neurophysiological observations (the markers of bruxism include mandibular tremor, dissociation of the activity of the masticatory and temporal muscles) (Laine et al., 2015).

The leading link in the pathogenesis of bruxism is the defeat of the neuromuscular synapse. At the same time, the mechanisms for the occurrence of bruxism have not yet been elucidated, which greatly complicates the prevention of this disease. Bruxism in 94% of cases accompanied by functional disorders in the masticatory muscles and may be the cause of dysfunctional states of the cranio-mandibular complex (Manfredini et al., 2010).

Early diagnosis of bruxism plays an important role in predicting the course of the disease and minimizing the complications of the craniomandibular system. A simple and effective method for the early diagnosis of bruxism can be portable surface electromyography

(PSE). This diagnostic method is easy to perform, non-invasive and harmless to the patient, does not cause discomfort, and does not require lengthy training of a doctor and a specially equipped room.

The goal of treating hypertonic chewing muscles is the relaxation and elimination of muscle pain (Orlova et al., 2009, Soykher et al., 2013). Today there is no single treatment protocol of hypertonus of masticatory muscles (Soykher et al., 2013).

## MATERIALS AND METHODS:

The study involved 70 patients.

The average age of 40 years. Gender-based division of men 20%, women 80%.

The selection criteria: diagnosis of bruxism, which was stage according to the criteria of AASM.

The survey consisted of a dental and clinical neurological examination of patients. To register the bioelectric potentials of the studied muscles, an interference (surface) method of electromyography used. The study conducted using an electromyograph "Synopsis" ("Neurotech", Russia). Superficial electromyography performed prior to treatment, on days 3, 7, 14, 28, and for 4 months.

When conducting superficial electromyography of the chewing muscles and neck muscles, the following results were obtained: asymmetry of the temporal, chewing muscles, neck muscles, high indicators of the total biopotential of the studied IMPACT muscles: teeth compression test of  $8600 \pm 1989 \mu V$ , brooks behavior test  $5800 \pm 1389 mV$ , Test "rest"  $300 \pm 189 mV$ . Spontaneous muscle activity was determined in a state of relative physiological rest.

When analyzing a chewing sample, there is a violation of the symmetry of chewing, frequency, amplitude, phase and the total biopotential of chewing IMPACT  $7800 \pm 1989 \mu V$ . Unilateral chewing was observed in 28 patients (in 23 patients, right-sided, 15 left-sided).

Injections "Relatoks" drug produced in proper chewing, temporal muscles bilaterally symmetrical. In the chewing muscles percutaneously at a dose of 30-50 units. on one side, in the temporal muscles in a dose of 15-20 U. on one side. The average total dose is 100 IU. Target muscles for injection were selected on the basis of clinical and EMG evaluation and in accordance with standard recommendations.

## RESULTS:

Analysis of the clinical data showed that the positive dynamics of the patient's condition in the form of reducing the intensity of pain, improving sleep,

improving the emotional background, increasing the volume of active movements of the lower jaw, changing the facial oval, increasing the opening of the mouth and restoring the chewing function, was on average 7-14 day after injection. The maximum effect achieved on average 21-30 days after injection. It was noted the restoration of the density of muscle tissue, leveled trigger phenomenon. Of particular interest is the dynamics of PSE changes during surface electromyography. The dynamics of PSE changes during surface electromyography is of great interest. Already on the third day, there was a decrease in the total biopotential of the studied muscles and a further drop within 14 days. Dynamic control over 4 months (one time per month carried out by PSE-study) showed the duration of the retention of muscle relaxant effect.

### CONCLUSIONS:

Analysis of the effectiveness of treatment showed that the study showed a positive effect of botulinum toxin type A "Relatox" on the electromyographic characteristics reflecting the functional state of the facial muscles. Muscle relaxation and reduction of pain intensity, which arise as a result of injections of botulinum toxin type A, leads to an increase in the volume of active movements of the masticatory system, and the activity and speed of the chewing movements performed. As a result, the vicious circle "spasm-pain-spasm" is broken, a normal motor stereotype of the lower jaw movement is formed, symmetry and the average amplitude of muscular contractions of the chewing muscles are restored. New methodical solutions, new technologies needed to create a protocol for the treatment of bruxism. Only an integrated approach to treatment allows you to choose techniques that will preserve health and improve the quality of life of the patient.

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