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Research Article

**CHANGE OF ANTITRYPTIC ACTIVITY OF MIXED SALIVA  
IN ORTHOPEDIC PATIENTS WITH SYNDROME OF  
INTOLERANCE TO ACRYLIC PLASTICS DURING  
PROSTHETICS WITH REMOVABLE PLATE PROSTHESES**<sup>1</sup>Sevbitov A.V., <sup>2</sup>Zhad'ko S.I., <sup>1</sup>Timoshina M.D., <sup>3</sup>Simagina E., <sup>3</sup>Rokhoeva M.<sup>1</sup>I.M. Sechenov First Moscow State Medical University (Sechenov University), <sup>2</sup>V. I. Vernadsky Crimean Federal University, Medical Academy named after S. I. Georgievsky,<sup>3</sup>Peoples Friendship University of Russia**Article Received:** January 2019**Accepted:** February 2019**Published:** March 2019**Abstract:**

*The aim of the study was to study the effect of removable dentures made of acrylic plastics on the antitryptic activity of mixed saliva in orthopedic patients with intolerance syndrome. Antiaritmicheskoy activity of saliva (ATA) were determined by V. F. Nartikova and T. S. Pashkina. As a result of studies it was found that the imposition of removable dentures causes inflammation of the mucous membrane of the prosthetic bed, which is manifested by an increase in the antioxidant activity of mixed saliva. The complex treatment leads to a decrease and normalization of the antitryptic activity of mixed saliva and reduces the toxic effect of acrylic plastics on the mucosa of the prosthetic bed.*

**Keywords:** *removable laminar dentures, intolerance syndrome, mixed saliva, anti-tryptic activity.***Corresponding author:****Sevbitov Andrey,**

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**INTRODUCTION:**

One of the critical tasks of prosthetic dentistry is optimal restoration of the lost functions of the dentofacial system, including with the use of removable laminar dentures. [1-2]

The need for removable dental prosthetics in patients with partial or complete absence of teeth increases every year. At the moment, the number of persons using removable structures is 42.6 % on average. [3-4]

The main materials for the manufacture of removable denture bases are currently acrylate-based plastics. A long-term experience of using acrylic base plastics has shown that they possess both positive (low cost, availability, sufficient strength, manufacturability) and negative properties (excessive release of residual monomer, the phenomena of individual intolerability). The occurrence of intolerability to dental construction materials varies from 1.7 % to 12.3 % of the number of people using dentures and is manifested by development of inflammatory and reactive processes in the tissues of the denture base. [5-6]

The search for neutral biologically compatible materials mainly focuses on the development of new materials, but, on the other hand, the use of traditional materials in combination with drugs that affect various links in the pathogenesis of intolerability is of particular interest. [7-8]

A significant mechanism of the pathogenesis of inflammatory changes in the mucous membrane of the denture base when using removable acrylic plastic laminar dentures is the decrease in the enzymatic activity of saliva. [9-10]

**Aim:**

The aim of the study was to investigate the influence of removable acrylic plastics laminar dentures on anti-tryptic activity of mixed saliva in orthopedic patients with intolerance syndrome.

**MATERIALS AND METHODS:**

This work was done at Sechenov University with supported by the "Russian Academic Excellence Project 5-100".

The study included 45 patients (23 women and 22 men) with the intolerance syndrome who use the removable laminar dentures made of Ftorax plastic by compression molding according to the standard technique. These patients were included into the test group (age: 45–75 years). The control group included 15 patients who did not need orthopedic treatment. The study included collection of anamneses,

examination of the oral cavity, examination of the mucous membrane and alveolar bone in the area of missing teeth, clinical and laboratory methods of examination. The obtained data were recorded in a specially designed study protocol, which complements the generally accepted form of the dental patient's medical history.

Patients with the intolerance syndrome underwent complex treatment, including the use of an improved method of manufacturing of removable dentures from acrylic plastics, as well as the use of Normoflorin-L biocomplex in the form of mouthwashes (3–4 times a day). The course lasted 7 days. Normoflorin-L is a natural biocomplex, containing no preservatives, dyes, taste adapters, has a pronounced antiseptic, antimicrobial, anti-inflammatory effect on the oral mucosa. In a short time, it suppresses the activity of pathogenic microflora and removes its toxins, creates a protective biofilm on the mucous membrane.

The improvement of the method of manufacturing the removable dentures from acrylic plastics is based on the addition of 0.05 g of Polisorb MP absorbent to the acrylic plastic powder prior to its polymerization, followed by polymerization of the plastic in a water bath and its cooling in the form. The proposed method allows for detoxication and antiallergic effect due to Polisorb MP properties during the toxic effects of methyl methacrylate on the denture base's tissues.

The material of our study is mixed saliva of patients with the intolerance syndrome. Anti-tryptic activity of saliva (ATA) was determined by V. F. Nartikova's and T. S. Paskhina's method. The method is based on determination of inhibition of N-a-benzoyl-L-arginine ethyl ether (BAEE) (BAEE-esterase activity of trypsin by saliva). Two samples (test and control) were prepared for the determination of the ATA in the thermostatic cuvettes of the spectrophotometer. The test sample contained 1.4 ml of 0.05 M tris-HCL buffer (pH -8.0), 0.5 ml of saliva and 0.1 ml of trypsin solution (10 µg) in 1 mM of HCl containing 10 mmol of CaCl. SPOFA trypsin with a specific activity of 18-22 U/mg was used for all determinations. The control sample contained the same components except for saliva. Both samples were kept for 5 minutes at 25 °C, then 1 ml of 1.5 mmol BAEE solution was added to each sample, the samples were rapidly mixed, and the increase in optical density was measured at 253 nm against the sample for spontaneous hydrolysis of the substrate. The measurements were taken every minute for 4–5 minutes from the linear portion of the optical density gain curve for 1 minute for the test and control samples. The difference between these values was

used to calculate ATA in IU/ml. The activity was calculated according to the formula:

$$(\Delta D_k - \Delta D_0) \times 2.73/0.5 = (\Delta D_k - \Delta D_0) \times 5.46 \text{ IU/ml,}$$

where  $\Delta D_k$ ,  $\Delta D_0$  is the optical density gain in the test and control samples for 1 min.

One inhibitor unit (IU) is equal to the amount of inhibitor that inhibits or binds the formation of 1  $\mu\text{mol}$  of benzolarginin (BA) for 1 minute.

The results were processed by a variation statistics method with the definition of Student's t-test using standard Microsoft Office 2010 programs on a Pentium class personal computer. The values were considered reliable at  $p < 0.05$ .

**Table 1: Parameters of antitryptic activity of mixed saliva in orthopedic patients with the intolerance syndrome (IE/ml)**

| Parameter | Control (healthy participants) | After the use of removable dentures | After complex therapy |
|-----------|--------------------------------|-------------------------------------|-----------------------|
| M $\pm$ m | 145.06 $\pm$ 15.10             | 170.15 $\pm$ 13.22                  | 149.15 $\pm$ 12.33    |
| P         |                                | < 0.05                              | > 0.05                |

p – reliability against the control.

### RESULTS AND DISCUSSION:

In patients with the intolerance syndrome to acrylic plastics, who use the removable laminar dentures made of Ftorax plastic manufactured by the compression molding according to the standard technique, the antitryptic activity of mixed saliva was increased by 17.2 % ( $p < 0.05$ ) and was 170.15  $\pm$  13.22 IU/ml against ATA parameters in healthy individuals of 145.06  $\pm$  15.10 IU/ml.

After complex activities, including the use of an improved method of manufacturing the removable laminar dentures – the addition of 0.05 g of Polisorb MP absorbent to the acrylic plastic powder prior to its polymerization, as well as the use of Normoflorin-L biocomplex in the form of mouthwashes, the parameter of antitryptic activity of mixed saliva approached the control indicators and amounted to 149.15  $\pm$  12.32 IU/ml ( $p > 0.05$ ).

### CONCLUSIONS:

It is established that the use of removable laminar dentures may cause inflammation of mucous membrane of the denture base manifested by increase of anti-oxidizing activity of the mixed saliva.

Complex treatment leads to reduction and normalization of antitryptic activity of mixed saliva.

The use of an improved method of manufacturing the removable laminar dentures and Normoflorin-L biocomplex reduces the toxic effect of acrylic plastics on the mucous membrane of the prosthetic area.

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