

The Inflammatory Process in the Oral Cavity Based on Biopotentialometry

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Abstract

Getting patients to use any kind of orthopedic structures involve complex adaptation processes. A method of quantitative evaluation of the inflammatory process in the periodontal tissues has not found wide application because of the lack of special equipment. We adapted biopotentialometry type "Multitest IPL-301" for use in the oral cavity. The study involved 74 patients aged 18-28 years. We developed a point system to quantify inflammation in the oral cavity can be accepted as an objective criterion for the effectiveness of the orthopedic treatment.

Keywords: *Biopotentialometriya; Adaptation; Fixed Bridges*

A large number of scientific studies of national and international authors are devoted to problems related to adaptation of oral tissues to manufactured dental prostheses. The beginning of patients' use of removable types of orthopedic structures involves complex adaptation processes. But not a lot of scientific work devoted to patients' adaptation to permanent dental bridge structures. It is only in complete absence of complaints and objective changes full adaptation of the patient to orthopedic structures can be spoken about.

One of the indicators of adaptation to orthopedic structures is absence of inflammation of the mucosa in the area of contact with the prosthesis. Schiller-Pisarev's sample (macrohistochemical study) makes it possible to evaluate inflammatory processes in periodontal tissues. But the use of this method does not allow to objectively judge the expression of mucosal tissue inflammation of oral cavity (MTOC). In the middle of the last century was developed a device called biopotentialometer BPM-03 to diagnose pathological dental gum pockets diseases of MTOC, but it is currently out of production. There are modern portable laboratory automated digital measuring devices biopotentialometers of "Multitest IPL-301" type, but it is also impossible to measure the value of biopotential of oral mucosa with this device as well.

In 2002, Kirillova L.A. and her co-author developed a method that identifies quantitative value of the inflammatory process in periodontal tissues. With the help of this method we can determine metabolic potentials in gum mucosal tissue in patients, with followed of Schiller - Pisarev's sampling. It has been found that the value of the potential of the gum mucosa membrane the subjects with a negative Schiller-Pisarev sample is (-10.04 ± 0.56) mV, a slightly positive Schiller-Pisarev sample is $(7, 39 \pm 1.64)$ mV, a positive Schiller-Pisarev sample is $(19, 83 \pm 1.28)$ mV [1-3].

The factor of an absence of a device that is necessary to determine the condition of the oral mucosa, and as well as absence of explicit criteria for evaluating potentialometer readings, makes it difficult to widely use this method and to quantify the inflammatory process in periodontal tissues.

Goal: to apply a biopotentialometer of "Multitest IPL-301" type in the oral cavity, to develop a grade system for quantitative evaluation of the inflammatory process in the oral cavity.

To measure the biopotential of the oral mucosa we have developed an adapter that allows us to attach two silver chloride electrodes to the biopotentialometer "Multitest IPL-301", and apply this method to the dental practice. Two electrodes are introduced into the oral cavity: one (measuring) - to make contact with the studied section of the mucous membrane, second (reference electrode) is applied to the section of the mucous membrane of the sublingual area on the border of the cavity bottom palate and its central part. If there is differentiation of potential is positive, we can talk about the presence of inflammatory periodontal processes. Negative potential differentiation indicates the presence of an inflammatory process in periodontal tissues. The magnitude of the potential differentiation depends on the degree of expression of the inflammatory process. On the scale of the device displayed digital values of biopotentials of oral mucosa and periodontal tissues measurement through electrodes that are connected to potentialometer "Мультитест IPL-301".

Measurements done on biopotentials of the mucous membrane of the marginal periodontal in 74 patients aged 18 to 28 years, which were at the orthopaedic treatment stage, with simultaneous evaluation of the Schiller-Pisarev sample from these subjects. Based on obtained data, we developed a quantitative point system for measurement of the inflammatory process of the oral cavity:

- Negative potential difference.
- Point - positive potential difference (from 0 to 9 mV).
- Points - positive potential difference (from 9 to 20 mV).

Based on the results of the various studied potentials differences of the parodontal sites, can be argued that the magnitude of the potential difference characterizes the expression of metabolic processes occurring in the oral mucosa, and can be accepted as an objective criterion for assessment of the inflammatory process in the parodontal tissues and the effectiveness of the performed orthopaedics treatment.

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