RS Global

INTERNATIONAL

Scientific and Practical CONFERENCE

International Trends in Science and Technology

Proceedings of the IX International Scientific and Practical Conference

International Trends in Science and Technology

Vol.2, January 31, 2019, Warsaw, Poland

ISBN 978-83-952507-4-3

RS Global Sp. z O.O.
Warsaw, Poland
2019

Founder:
RS Global Sp.z O.O.,

Research and Scientific Group
Warsaw, Poland

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MEDICINE

COMPARATIVE ASSESSMENT OF INFLAMMATORY ZONES AT THE STAGES OF USING THE COMPLETE REMOVABLE PROSTHESES

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Abstract*. Traditional removable plastic dentures will only meet all the requirements if they are made taking into account all the anatomical and physiological features of the patient's oral cavity. Usually making a "perfect" demolition prosthesis is very difficult, and sometimes impossible, because a number of physiological and pathological processes that arise in the loss of teeth lead to numerous changes in the tissues of the oral cavity and their relief. Therefore, there was a need to use adhesive materials to improve the fixation of complete removable dentures from the first days of the overlap of the prosthesis, which would solve the problem of sufficient fixation of the prosthesis and the ratio of the basis with the tissues of the prosthetic plate in the process of adaptation and long-term use. The change of the areas of inflammation of the mucous membranes of the prosthetic lobes of patients of both groups (in the first one - using the stabilizing material "Stomafix 1" (adhesive material on the basis of dimethyl-karbendiciloxymethyl AMDK), in the second - the adhesive material "Korega" (adhesive material on the basis of karboxypeptidase - AMKP) at the time of manufacturing of complete removable plastic prostheses with acrylic bases, after using them on the second day, 7 days, 14 and 21 days of use of prostheses. For the visualization of the inflammation zones due to the increased mechanical load on the mucous membrane of the prosthetic plate, as well as the dynamics of changes in the inflammation zones, they used the method of Lisniy N.I. The criteria for evaluation were the following parameters: no ignition, the area of the inflammation zone does not exceed 1 cm^2, the area of the inflammation zone is greater than 1 cm^2. The following data were obtained: the total area of inflammation zones of the mucous membranes, the average area of inflammation of the mucous membranes of the prosthetic plate(cm^2) and the mean error of the average area of inflammation of the mucous membranes of the prosthetic plate(cm^2) at each of the observation stages in both groups. When orthopedic treatment of patients it is necessary to take into account the possibility of increasing the functional efficiency of complete removable plastic prostheses by reducing the areas of inflammation of the mucous membrane of prosthetic lobes of patients with the use of adhesive material. Correction of acrylic bases of complete removable plastic dentures reduces the area of inflammation of the mucous membranes of the prosthetic plate from the initial within (24,4÷1,2) %, depending on the materials used and the period of use of dentures.*

Keywords: *inflammation of the mucous membrane, adhesive material, complete removable plastic prostheses, fixation, stabilization, edentulous jaws.*

Introduction. One of the topical problems of orthopedic dentistry is to increase the functional efficiency of removable prostheses and to prevent atrophic changes in the supporting tissues of the prosthetic plate by improving the methods of prosthetic production. The solution to this issue is directly dependent on specific clinical conditions. Expression of bony protuberances, covered with a thin mucous membrane, the presence of zones with a large difference in degree of compliance, acute alveolar crest and other anatomical-physiological and topographic features of the toothless areas cause difficulties with the use of removable dentures. In the above-mentioned clinical conditions of the prosthetic plate, the prosthetic base should be differentiated, that is, the appropriate layer of adhesive material should restore the depreciation properties of a thin mucous layer with low pliability, with the essential condition being the discharge of zones prone to atrophic processes, and load of sites resistant to atrophy [1].

Traditional removable plastic dentures will only meet all the requirements if they are made taking into account all the anatomical and physiological characteristics of the patient's oral cavity. Usually it is very difficult to make a "perfect" demolition prosthesis, and sometimes it is impossible, because a number of physiological and pathological processes that arise in the loss of teeth leads to numerous changes in the tissues of the oral cavity and their relief [2].

The degree of increasing the functional efficiency of complete removable dentures, improving the adaptation of patients to them can be determined by clinical differential studies: the degree of fixation, stabilization during the function of chewing, the uniform transmission of masticatory pressure on the subordinate tissue, namely the structural features of removable prostheses [3, 4]. In clinical practice, most detachable dentures are made with rigid, more rarely double-layered basis, due to the

simplicity of manufacture and lower cost [5]. But these constructions are not always able to provide positive treatment results, especially in the unfavorable anatomical and topographic conditions of the prosthetic plate [6]. Therefore, it became necessary to use adhesive materials to improve the fixation of complete removable dentures from the first days of the overlap of the prosthesis, which would solve the problem of sufficient fixation of the prosthesis and the ratio of the basis with the tissues of the prosthetic plate in the process of adaptation and long-term use [7].

By studying qualitative characteristics (on the basis of the Central Laboratory of the domestic manufacturer of stomatological materials - JSC "Stoma" and the Department of Orthopedic Dentistry of the KhNMU), a new adhesive material "Stomafix 1" was developed and introduced into the production of JSC "Stoma" (adhesive material on the basis of dimethyl-karbetsiloxemethyl - AMDK) for fixation and stabilization of complete removable plate prostheses. The proposed adhesive composition, created on the basis of domestic ingredients designed to improve the quality of fixation, improve the stabilization of complete removable lumbar prostheses in the oral cavity and accelerate the adaptation to removable prostheses is biosecurity, promotes the prevention of allergic reactions and reduces the process of atrophy in the bone tissue of the alveolar process [8].

The purpose of the research: reducing the period of adaptation of patients to complete removable prostheses and increasing the functional efficiency of complete removable plastic prostheses by reducing the areas of inflammation of the mucous membrane of the prosthetic plate of patients with the application of adhesive materials.

The object and methods of research. We have studied the change in the areas of inflammation of the mucous membranes of the prosthetic plate of 73 patients of both groups (in the first n = 37 - with the adhesive material AMDK, in the second n = 36 - the adhesive material "Korega" (adhesive material on the basis of karboxypeptidase - AMKP) at the time of manufacture of complete removable plastic prosthesis with acrylic bases according to the traditional method, after using them on the second day, after 7 days, 14 and 21 days of using dentures. For the visualization of the inflammation zones due to the increased mechanical load on the mucous membrane of the prosthetic plate, as well as the dynamics of changes in the inflammation zones, they used the method of Lisniy N. I. [1990]. This technique is based on the evaluation of colored areas of inflammation of the mucous membrane and the areas of their accurate mappings on the basis of the prosthesis. To detect zones of functionally overloaded and as a result inflamed mucous membrane of the prosthetic plate, a Schiller-Pisarev solution was applied. The areas of inflammation were clearly contrasted, getting different in intensity of color. The topographic mapping of overload zones on the basis of the prosthesis was obtained by applying an emulsion of starch to its inner surface. The method is based on the use of chemical reaction of starch with iodine, as a result of which the starch is painted in more or less intense color. Using a planimetric grid, the areas of inflammation zones were determined. The criteria for evaluation were the following parameters: no ignition, the area of the inflammation zone does not exceed 1 cm2, the area of the inflammation zone is greater than 1 cm2. The following data were obtained: the total area of inflammation zones of the mucous membranes, the average area of inflammation of the mucous membranes of the prosthetic plate (cm2) and the mean error of the average area of inflammation of the mucous membranes of the prosthetic plate (cm2) at each of the observation stages in both groups.

The research was carried out in compliance with the basic provisions of the "Rules of Ethical Principles for the Exercise of Human Medical Scientific Research", approved by the Helsinki Declaration (1964-2013), ICH GCP (1996), EEC No 609 of 24.11.1986, orders of the Ministry of Health of Ukraine No. 690 dated September 23, 2009, No. 944 of December 14, 2009, No. 616 dated 03.08.2012. Each patient signed an informed consent to participate in the study.

In the course of clinical and statistical analysis of the research results, as well as for the development of standardized evaluation and diagnostic algorithms, methods of structural functional analysis, polynomial modeling and licensed software products (STATISTICA, EXCEL) have been used.

Results of the research and their discussion. Based on our studies, the greatest presence of inflammation zones was observed in both groups when patients did not use adhesive materials. With 1 day of use of adhesive materials, an increase in the number of patients with the absence of inflammation zones was observed. Considering the phases of adaptation for Courland, one can observe the decrease, as well as the absence, of the number of patients with the presence of inflammation zones, depending on the duration of the use of dentures, namely days: 1 day - no inflammation zones

at all - 18 patients, ≤ 1 cm2 - 16 patients,> 1 cm2 - 3 patients, and if we take 21 days, then there is no presence of inflammation zones - 30 patients, ≤ 1 cm2 - 7 patients,> 1 cm2 - no.

It was found that the total area of inflammation of the mucous membranes of the prosthetic plate of patients in the two clinical groups was maximal with the use of complete removable plastic dentures with acrylic bases, on the second day it decreased and amounted to the patients in the first and second groups, respectively, 24.4% and 25, 6% of the original; after 7 days of observations - respectively 1.82% and 6.5%; after 14 days - 1.2% and 1.6%; after 21 days, the total area of inflammation of the mucous membranes of the prosthetic beds of patients in the two clinical groups slightly increased and amounted to 4.3% and 7.2%, respectively, of the original (Figure 1). In addition, in all periods against the background of decreasing the number of patients with the presence of inflammation zones of the mucous membrane of prosthetic plate, there was a decrease in the number of patients with areas of inflammation of mucous membranes of prosthetic plate>1cm2.

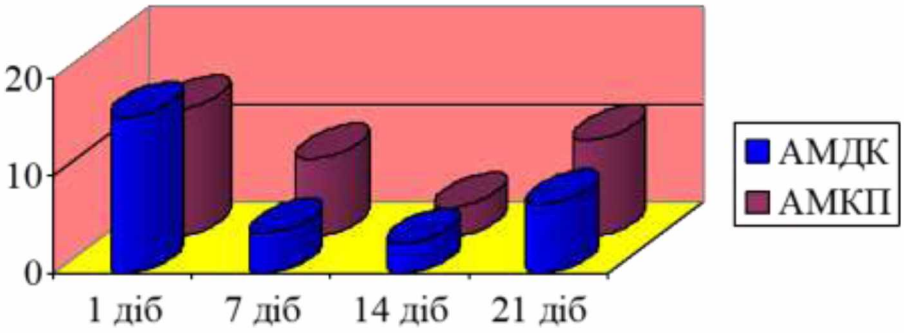

Fig. 1. Dynamics of changes (%) of areas of inflammation of the mucous membranes of the prosthetic plate depending on the adhesive material and the observation period (1 - on the second day, 2 -7 days, 3-14 days, 4-21 days).

Estimation of the areas of inflammation of the mucous membranes of the prosthetic plate of patients in the first clinical group (Table) showed that on the average on the second day after the use of stabilizing material, there was a significant (t=3.6; p <0.050) decrease in inflammation areas compared with the use of a prosthesis without application stabilizing material: from (1.10±0.13) cm2 to (0.52±0.09) cm2. After 7 days after the completion of orthopedic treatment, the average area of inflammation zones decreased (t = 3.6, p <0.050) and amounted to (0.19 ± 0.04) cm2. After 14 days, this figure was (0.16 ± 0.05) cm2. After 21 days, the average area of inflammation zones increased slightly and amounted to (0.25 ± 0.05) cm2, which indicates the potential increase in bacterial contamination of the structures and requires the use of measures to decontaminate the prosthetics.

Table 1. Dynamics of areas of areas of inflammation of the mucous membrane of the prosthetic plate under the influence of adhesive materials in two clinical groups

Availability and area of ignition		The name of the adhesive material									
		AMDK (n=37)					AMKP (n=36)				
		W.mat-l	1 day	7 days	14 days	21 days	W.mat-l	1 day	7 days	14 days	21 days
is absent		-	18	33	34	30	-	19	18	36	26
≤ 1 см2		18	16	4	3	7	19	13	8	3	10
> 1 см2		19	3	-	-	-	17	4	-	-	-
Total	patients with inflammation zones	37	19	4	3	7	36	17	8	3	10
	S см2	40,6	9,9	0,74	0,49	1,74	39,9	10,2	2,62	0,62	2,86
	% initial	-	24,4	1,82	1,2	4,3	-	25,6	6,5	1,6	7,2
	M	1,10	0,52	0,2 a	0,16	0,25	1,11	0,60	0,33	0,21	0,29
	±m	0,13	0,09	0,04	0,05	0,05	0,13	0,11	0,05	0,03	0,05

Initial: n - number of patients; M - average area of inflammation of the mucous membrane of the prosthetic plate (cm2); m - the average error of the area of inflammation of the mucous membrane of the prosthetic plate (cm2); S - the average area of inflammation zones when applying AMDK material is significantly lower (p <0,050) than when applying AMKP material for the identical observation period.

In evaluating the areas of inflammation of the mucous membrane of the prosthetic plate of patients in the second clinical group (table), a similar pattern of changes in the average area of inflammation zones in certain periods is observed. In the period of 7 days, the average area of inflammation of the mucous membranes of the prosthetic plate of patients in the first clinical group was significantly (p <0.05) less than patients in the second clinical group.

Proved that dentures cause pathological changes in the structural elements of the epithelium of the prosthetic plate, which leads to a decrease in the barrier function of the epithelium of the mucous membrane [9]. In 64% of patients under the bases of prosthetics, diseases of the mucous membrane of traumatic etiology develop [10]. In addition, in the process of orthopedic treatment with removable plate dentures, the area of the prosthetic plate decreases. The change in the area of the prosthetic bed depends on the period of use of removable structures: on the upper jaw one year later it is reduced by 1.5%, on the lower jaw - by 3.4% of the original value, after 3 years - by 6.7% and 10.3% [11].

Conclusions. When orthopedic treatment of patients it is necessary to take into account the possibility of increasing the functional efficiency of complete removable plastic prostheses by reducing the areas of inflammation of the mucous membrane of prosthetic plate of patients with the use of stabilizing material. Correction of acrylic bases of complete removable plastic dentures reduces the area of inflammation of the mucous membranes of the prosthetic plate from the initial within (24,4 ÷ 1,2) %, depending on the materials used and the period of use of dentures. With the use of AMDK stabilizing agent for stabilization, it is possible to achieve a significant (p <0,050) reduction in the area of inflammation of the mucous membranes of the prosthetic plate in the first week of use of prostheses, than with the use of stabilizing material AMKP. During the 21 days of clinical use of dentures, an increase in the area of inflammation zones of mucous membranes of prosthetic plate is observed, requiring the use of decontamination measures.

Prospects for further research. In order to improve the fixation and stabilization of removable prostheses, it is advisable to recommend the use of adhesive materials that reduce pain during the adaptation period, reduce the period of adaptation, as well as shown in cases of thinning of the mucous membrane, atrophy, narrow and thin alveolar sprouts, after surgical interventions within the dentition, recommended to patients who first applied to the orthopedic department.

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Proceedings of the
IX International Scientific and Practical Conference
International Trends in Science and Technology

(Vol.2, January 31, 2019, Warsaw, Poland)

MULTIDISCIPLINARY SCIENTIFIC EDITION

Indexed by:

Passed for printing 25.01.2019. Appearance 31.01.2019.
Typeface Times New Roman.
Circulation 300 copies.
RS Global S. z O.O., Warsaw, Poland, 2019