

# ОРТОПЕДИЧНА СТОМАТОЛОГІЯ

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## ORTHOPEDIC TREATMENT OF PATIENTS WITH EDENTULOUS JAWS WITH COMPLETE REMOVABLE PLASTIC DENTURES USING ADHESIVE MATERIAL

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### 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 problem is directly related to the specific clinical conditions [1]. The pronounced bone protuberances, covered with a thin mucous membrane, the presence of zones with a large difference in the degree of inflexibility, acute alveolar crest and other anatomical-physiological and topographical features of the edentulous jaws cause difficulties when using removable dentures [2]. In the above-mentioned clinical conditions of the area, the prosthetic base should be differentiated, that is, the appropriate layer of adhesive material should restore the depreciation properties of a thin mucosal layer with low sufficiency, with the essential condition being the discharge of zones prone to atrophic processes, and loading areas resistant to atrophy [3].

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" detachable prosthesis is very difficult, and sometimes 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 [5].

Increasing the functional efficiency of complete removable dentures, improving the adaptation of patients to them can be provided by clinical differential exploring: the degree of fixation, stabilization during the function of chewing, the uniform transmission of chewing pressure on the subordinate tissue, namely, the structural features of removable dentures [5,6]. An example of the effect of excessive loading on the alveolar process its atrophy under the basis of a removable plastic prosthesis, which is used to eliminate secondary deformations

associated with vertical dental alveolar elongation. With the correct distribution of chewing pressure, transferred by the basis of a prosthetic plate, the atrophy of the alveolar processes is much slower and sometimes not observed at all [9]. In clinical practice, most detachable dentures are made with rigid, more rarely double-layered basis, due to the simplicity of manufacture and lower cost [2]. But these structures are not always able to provide positive treatment outcomes, especially in the unfavorable anatomical and topographic conditions of the prosthetic plate [1]. Therefore, it became necessary to use adhesive materials to improve the fixation of complete removable dentures from the first days of the overlap, 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 [4].

When solving the problem of fixation and stabilization of a removable prosthesis on the tissues of the prosthetic plate, the perception of the adhesive material by the patient is not always taken into account, as well as the interaction of such factors as "prosthesis-adhesive", "adhesive-mucous membrane of the oral cavity", "adhesive-microflora of the cavity mouth", such as biosecurity of the adhesive composition [7].

To date, there is no perfect method of orthopedic treatment, which would provide a guaranteed fixation of the prosthesis on the edentulous mandible, especially in cases of its sharp atrophy or other numerous changes in the relief of the mucous membrane of the oral cavity. The potency of adhesion that occurs between the prosthetic base and the mucous membrane of the prosthetic plate at the expense of the oral fluid is not always sufficient for the complete fixation, and even more so, the stabilization of complete removable dentures, resulting in a deterioration of their functional value [8]. The use of adhesive agents significantly increases the effectiveness of fixation and stabilization of complete plastic dentures due to unfavorable anatomical and topographic conditions of the masticatory

apparatus. Adhesive compositions are easy to use. They increase the functional value of not only newly made, but also old prosthesis, reduce the displacement of the prosthesis from the prosthetic plate, the ingestion of food under the prosthesis, therefore the use of the prosthesis becomes more comfortable [6].

The study of patients with one or both edentulous jaws on the basis of the Department of Orthopedic Dentistry at the University Dental Center of Kharkov National Medical University received indicators of the mucous membrane state, divided into types of edentulous jaws and collected statistical data with the use of fixing adhesive material.

**Purpose of the research:** to evaluate the effectiveness of using fixation adhesive material with complete removable prosthesis due to the distribution of edentulous jaws by types of Schroeder and Keller classes, taking into account the degree of atrophy of the bone fundamentals of the alveolar processes and the mucous membrane, detection and accounting of adverse factors for the fixation and stabilization of the prostheses using fixative adhesive material.

#### Materials and methods of research

To create a differential distribution of masticatory pressure through the bases of prosthesis on the tissues of prosthetic plate, clinical and technological methods were used, namely: taking into account the differential flexibility of the mucous membrane in different zones of the prosthetic plate. Determination of the pliability of the mucous membrane of the prosthetic plate is carried out in all patients with edentulous jaws until a functional imprint is obtained. Adequacy was determined in the area of the vestibular and oral rays of the alveolar processes, their crest, as well as the anterior, middle and posterior sections of the palate, and the number of measurements was reduced to 6 on the upper and 7 on the lower jaw.

To determine the status of patients with complete edentulous jaws on one or both jaws, 60 people aged 50 to 75 years were screened and prophylaxis. The surveyed applied for orthopedic help with complaints of violation of chewing and speech, cosmetic inconvenience, the impossibility of using previously manufactured dentures. At the time of collection, it was found that 45 patients had already been using complete removable dentures and due to complications such as: sharp deterioration of

fixation of prosthetics (36 patients), breakage of prosthetics (5 patients), erosion of artificial teeth in dentures (4 patients), patients preferred to refuse this type of tooth replacement. All other patients made prosthetics arranged as just done and perennial use. All of these patients did not use adhesive materials to improve the fixation of complete removable dentures.

The differential tolerance of the mucous membrane in different zones of the prosthetic plate of patients with complete edentulous on both or one of the jaws according to the Supply classification was considered, and divided into groups according to the atrophy of the alveolar process according to the Schroeder and Keller classifications. Also, creating clinical groups of patients: the first included patients who used complete removable dentures, and the second - which were prosthetic only non-removable dentures. At the same time, in order to improve the adaptation and fixation of complete removable dentures, patients of the studied groups used adhesive material.

#### Research results

Sixty patients with complete edentulous on both or one of the jaws were examined. On the upper and lower toothless jaws, the 2nd class of the mucosal membrane on Supply, (53.6±9.4)% and (58.3±9.1)%, respectively, was noted. In the lower jaw (29.2±9.3)% of patients was diagnosed with class 4 of the mucous membrane, whereas in the upper jaw there was no evidence of class 4 in this group of patients. The proportion of patients with upper jawbone jaws with class 3 of the mucous membrane (32.1±8.8)% of the prosthetic bed was dominated by a similar index in the lower jaw (12.5±6.3)%.

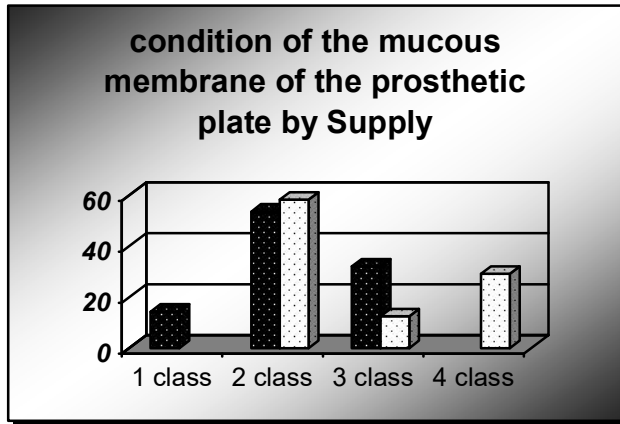
In a small number (14.3±6.6%), we had a class 1 mucosa in patients with edentulous upper jaws in the absence of patients with lower edentulous jaw. Such a distribution of toothless jaws with the presence of a prosthetic plate according to the classification by Supply caused the need to compensate for the insufficient pliability of the mucous membrane of the prosthetic plate in certain areas when treated with removable dentures due to the use of a cream for fixation. In cases of moderate pliability, the decision to use the cream for fixation was substantiated by taking into account the individual sensitivity of the tissues of the prosthetic plate of patients to mechanical loading.

Table  
Indicators of the condition of the mucous membrane and the type of edentulous jaws

Indicators of the state of the mucous membrane and types of edentulous jaws			Upper jaw		Lower jaw		Total	
			n	M,%	n	M,%	n	M,%
1.	condition of the mucous membrane of the prosthetic plate by Supply	1 class	4	14,3±6,6	-	-	4	7,7 ±3,7
		2 class	15	53,6±9,4	14	58,3±9,1	29	55,8±6,9
		3 class	9	32,1±8,8	3	12,5±6,3	12	23,1 ±5,8
		4 class	-	-	7	29,2±9,3	7	13,5±4,7
2.	Types of edentulous jaws *	I type	4	14,3±6,6	4	16,7±6,7	-	-
		II type	11	39,3±9,2	6	25,0±7,8	-	-
		III type	13	46,4±9,4	11	45,8±9,2	-	-
		IV type	-	-	3	12,5±5,8	-	-
Total			28	100	24	100	52	100

\* UJ - by Schroeder; LJ - by Keller

According to the indices of atrophy of the alveolar process of the edentulous upper jaws: the distance of the alveolar apex vertebra from the sites of attachment of lobes and bridges, height of palate by Schroeder, the vast majority (46,4±9,4)% were of type III, slightly less of the second type (14,3±6,6)%.



Edentulous lower jaws were classified according to Keller's classification. The vast majority of the patients treated with the edentulous jaw are III and II, namely (45.8±9.2)% and (25.0±7.8)%, respectively. The fate of types I and IV was 16.7±6.7% and 12.5±5.8% respectively (table, fig. 1).

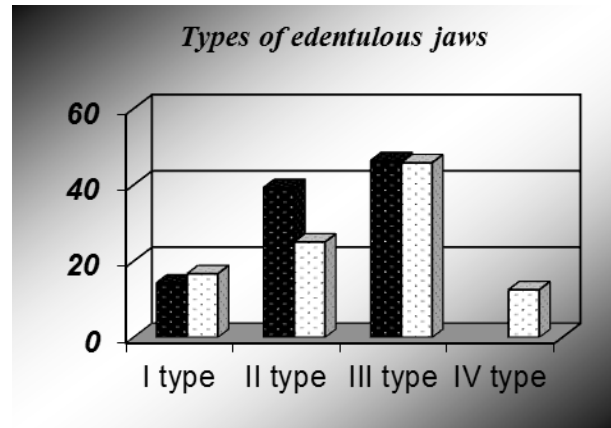


Fig.1 Distribution of treated patients with complete edentulous for indicators of mucosal condition and types of edentulous jaws

In cases of alveolar process atrophy in treated patients, the decision on the use of adhesive material was substantiated by taking into account the degree of expressiveness of the bony formations within the prosthetic plate, namely: maxillo-oblique line, bone protuberances, exostoses, thoracic and horns of the upper jaw.

**Conclusions.** According to the research data, this distribution of the types of edentulous jaws according to the classifications made it necessary to compensate for the significant bone loss of the alveolar sprout due to the application of a cream for fixation, which contributes to increased chewing efficacy and the prevention of further atrophy of patients using full removable prosthesis for the first time and again.

With adhesive materials, it is possible to achieve high indexes of fixation and stabilization of the prosthesis: the result is visible immediately after application, which leads to a positive subjective evaluation of the results of prosthetics by the patient, provides psychological comfort when talking and eating.

When using adhesive materials accelerates the process of adaptation. Thus, the use of adhesive cream seems appropriate and, of course, promising for practical use, in order to improve the fixation of removable dentures and faster adaptation to them.

These researches allow you to recommend adhesive material in the orthopedic dentistry clinic.

**Perspectives 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, and also show cases of thinning of the mucous membrane, atrophy, narrow and thin alveolar sprouts, after surgical interventions within a dentition recommended to patients who first applied to the orthopedic department.

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### Резюме

В статі відображено те, що однією з актуальних проблем ортопедичної стоматології є підвищення функціональної ефективності знімних протезів і профілактика атрофічних змін опорних тканин протезного ложа шляхом вдосконалення методів виготовлення протезів. Вирішення цієї проблеми знаходиться в прямій залежності від конкретних клінічних умов. При вищезгаданих клінічних умовах ложа, базис протеза повинен бути диференційованим, тобто відповідний шар адгезивного матеріалу повинен відновлювати амортизаційні властивості тонкого слизового шару з малою піддатливістю, причому неодмінною умовою є розвантаження зон, схильних до атрофічних процесів, і навантаження ділянок, стійких до атрофії.

При цьому, в процесі адаптації пацієнтів до протезів з використанням адгезивного матеріалу у проміжок до 3 діб, а також при проведенні вимірювання значень жувального тиску, жувальної ефективності пацієнт не пред'являв скарг на больові відчуття або виражений дискомфорт.

**Ключові слова:** повні знімні протези, адгезивний матеріал, фіксація протезів, жувальна ефективність, атрофія альвеолярного відростка.

### Резюме

В статье отражено то, что одной из актуальных проблем ортопедической стоматологии является повышение функциональной эффективности съемных протезов и профилактика атрофических изменений опорных тканей протезного ложа путем совершенствования методов изготовления протезов. Решение этой проблемы находится в прямой зависимости от конкретных клинических условий. При вышеуказанных клинических условиях ложа, базис протеза должен быть дифференцированным, то есть соответствующий слой адгезивного материала должен восстанавливать амортизационные свойства тонкого слизистого слоя с малой податливостью, причем неперемным условием является разгрузка зон, предрасположенных к атрофическим процессам, и нагрузка участков, устойчивых к атрофии.

При этом в процессе адаптации пациентов к протезам с использованием адгезивного материала в промежутки до 3 суток, а также при проведении измерения значений жевательного давления, жевательной эффективности пациент не предъявлял жалоб на болевые ощущения или выраженный дискомфорт.

**Ключевые слова:** полные съемные протезы, адгезивный материал, фиксация протезов, жевательная эффективность, атрофия альвеолярного отростка.

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### Summary

The article reflects that one of the topical problems of orthopedic dentistry is an increase in the functional efficiency of removable dentures and prevention of atrophic changes in the supporting tissues of the prosthetic area by improving the methods of manufacturing prostheses. The solution to this problem is directly dependent on the specific clinical conditions. Under the above clinical conditions of the prosthetic area, the basis of the prosthesis should be differentiated, that is, the corresponding layer of adhesive material must restore the damping properties of the thin mucosal layer with low compliance, the prerequisite being the unloading of zones predisposed to atrophic processes and the load of sites resistant to atrophy.

In the process of adapting patients to prostheses using the adhesive material for up to 3 days, as well as for measuring the values of the chewing pressure and chewing efficiency, the patient did not complain of pain or discomfort.

**Key words:** complete removable dentures, adhesive material, fixation of prostheses, chewing efficiency, atrophy of the alveolar process.