COMPARATIVE ASSESSMENT OF THE QUALITY OF ORTHOPEDIC TREATMENT ACCORDING TO EMG DATA IN PATIENTS WITH REMOVABLE DENTURES MANUFACTURED USING DIFFERENT LABORATORY TECHNIQUES

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Actuality: to date, the main sources of stomatological diseases that physicians are not able to eliminate are related to the factors of the external environment. In the first place, environmental pollution by industrial waste emissions, exhaust gas, and the development of the chemical industry plays an important role in this, which contributes to pollution not only of air but of water too. All this contributes to the early development and rapid spread of carious and non-carious diseases of the oral cavity. Which in the future leads to loss of teeth at a fairly young age.

To restore defects in dentition, it is important to attract implants with the subsequent construction of permanent structures of dentures, but due to the high cost, not all citizens of our country are able to pay expensive treatment, therefore the manufacture of removable dentures is topical in our time.

Many dental-technical materials are presented on the dental market of Ukraine, therefore the dentist has the task of reasonably selecting these materials.

The choice of compliant tooth-technical materials is based on the data of physico-mechanical and clinical and technological properties. Equally important is the laboratory (technological) stage of dentures manufacture. But the most reliable estimate remains the clinical indicators of quality - adaptation, chewing efficacy.

Therefore, the analysis of the adaptation process to a new prosthetic is important for understanding the methods of chewing muscle control and can provide valuable information for determining the further path of resolving various dysfunctions, which further qualitatively influences the adaptation to the prosthesis. For an understanding of the system of motor activity, and the determination of chewing efficiency, an analysis of electro-myiographic indicators and the kinetics of chewing gum is relevant.

Electromyographic analysis of the muscles of the maxillofacial area is one of the leading diagnostic methods in dental practice around the world. EMG analysis of chewing muscles allows to determine the changes in the functional state of the muscles in the chewing gum phase, at the stages of adaptation to removable orthopedic structures, and is an objective confirmation of the quality of the performed orthopedic treatment. The method of electromyography is painless and harmless to health, which allows actively to use this method for determining the bioelectric activity of the masticatory apparatus.

The purpose of the exploration is to compare the electromyographic indices in patients with removable dentures made using different laboratory techniques.

Materials and methods of research: To achieve the goal, 80 patients with partial tooth loss aged 45-65 years were examined and treated, which shows the replacement of dental defects with partial removable dentures. Patients who participated in the exploration were divided into three groups: patients of the first group of prosthesis were made of acrylic plastics by the thermo-injection method. For patients in the second group, prostheses were made of acrylic plastics of hot polymerization by a compression method. The third group consisted of patients, prosthetics which were made of new domestic acrylic plastics by the method of free molding with subsequent polymerisation under pressure.

Monitoring the efficacy of patients' treatment includes an objective assessment of functional parameters indicating the quality of the prosthesis and the level of satisfaction of the patient by prosthetics or the opposite of the presence of complaints. The main indicator of adaptation of patients in our exploration is the normalization of chewing function, which is evaluated by electromyographic analysis of chewing muscles.

In the electro-myiographic analysis of masticatory muscles, there were changes in the functional activity of chewing muscles, in the orthopedic treatment of patients with partial defects in dentition, removable dentures, using various technologies for their laboratory production. The research was carried out at the clinical base of the Department of Orthopedic Dentistry of the Kharkiv National Medical University. To do this, an electromyogram was recorded using the computer-based neurophysiological diagnostic system "M-TEST".

The conditions were the same for all subjects. Recording of the electromyogram was performed during the closure of the dentition in the central occlusion and during the chewing test. The researchers were offered to peel a nut of weight 800 mg (average weight of the nut) until there was a swelling reflex. EMG was performed on the day of the fixation of the prosthesis, after 7 days and 1 month after treatment. During EMG analysis, the mean amplitude was determined at the closure of the dentition, the average chewing amplitude.

Results and discussion: as a result of conducted electromyographic studies, digital data were obtained and presented in Table 1.

Tab. 1

Index	Deadline research		
	1 day	7 day	30 day
Functional characteristic of the masticatory muscles of patients after prosthetics by acrylic prosthesis made by the thermo-injection method (Group 1).			
compressing amplitude, μV	153,14	180,24	181,24
chewing amplitude, μV	140,01	160,18	162,18

Functional characteristic of masticatory muscles of patients after prosthesis by acrylic prosthesis made by compression method (Group 2)			
compressing amplitude, μV	161,1	170,21	159,21
chewing amplitude, μV	149,5	152,6	145,6
Functional characterization of masticatory muscles of patients after prosthetics with acrylic prostheses made by casting method with subsequent polymerization under pressure (Group 3)			
compressing amplitude μV	161,02	210,03	290,04
chewing amplitude, μV	148,1	159,1	165,1

On the day of the fixation of detachable orthopedic prostheses, the rates were practically the same in all studied groups, only the assessment of the second group, where the manufacture of partial removable prosthesis was performed by compression method, 5% were less than the first and third groups. The amplitude values for compression and chewing were respectively 153.14 and 140.01 in patients in the first group; 161.1 and 149.5 in patients in the second group; 161.02 and 148.1 μV in patients in the third group. One week after the fixation of the prosthesis, the compression and chewing amplitude was 180.24 and 160.18 μV respectively in patients in the first group; 170.21 and 152.6 μV for patients in the second group; 210,03 and 159,1 μV in patients with prostheses that were made by casting method. The indicators of the third group by 19% exceeded the indices of the subjects, at the treatment stages of which the thermo-injection method of partial prosthetics was used, and 16.5% higher than those of the second group using the compression method of prosthetic production. Indicators of the first and third groups differed slightly. One month after initiating the use of prosthetics in patients, the amplitude of compression and chewing of the masticatory muscle itself changed positively, in all groups of patients, and was 181.24 and 162.18 μV respectively; 159.21 and 145.6 μV; 290.04 and 165.1μV. The indicators of the third group significantly exceeded the digital data of the first and second groups, by 38% and 47%, respectively.

When comparing the treatment of patients with removable prostheses, manufactured using different laboratory techniques, we can note that the greatest chewing efficacy in patients using prostheses is made by the casting method 290.04 ± 0.23 μV. Not significantly less masticatory efficacy in patients with prosthesis produced by the thermo-injection method is 181.24 ± 1.05 μV, and the smallest index where dentures were made using the compression technique 159.21 ± 1.03 μV. That testifies to the high quality of adaptation and rebuilding of the muscular function and the patients with miotatic reflexes, which a partial removable prosthesis was made by casting method with subsequent polymerization with pressure.

Conclusions.

Thus, after the EMG of patients at the stages of adaptation to new partial removable prosthesis, it was determined that the technique of casting with subsequent polymerization under pressure in the manufacture of removable laminar prostheses, restores the chewing function more qualitatively, and induces adaptation and normalization of the muscular system to chewing .

The use of domestic injection molding plastics as a structural material for the manufacture of a base of removable dentures qualitatively increases the situation in terms of adaptation of patients to removable dentures, makes it possible to use them more comfortable, which significantly improves the quality of life of patients as a whole.

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