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STUDY OF THE FEATURES OF MASTICATORY EFFICIENCY IN PATIENTS WITH ACUTE CEREBROVASCULAR DISORDER BY HEMITYPE

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Abstract

The attention of dental researchers is constantly focused on assessing the quality of treatment for various pathologies of the dentoalveolar system, determining disorders of occlusal correlations, treatment, and prevention of diseases of the temporomandibular joint and periodontal tissue pathology. Numerous studies on the above aspects contain information on the characteristics of masticatory efficiency as one of the most vivid markers of orthopedic treatment, as it allows dentists to determine the quality of actual masticatory performance.

The issues of functional diagnostics at the stages of rehabilitation of patients with partial defects of the dentition remain relevant, and therefore, the indicators of masticatory efficiency in prosthetics with removable dentures will be one of the most important criteria for adaptation to them. The situation exacerbates when such patients suffer from somatic pathologies of a neurological nature, in particular, acute cerebrovascular disorder.

The aim of the research was to study the features of masticatory function in patients with a complicated course of acute cerebrovascular disorder with the neurological deficit by hemitype

The study involved 25 people with a complicated course of acute cerebrovascular disorder with the neurological deficit by hemitype and 20 people from the control group, aged from 40 to 65 years, for whom partial removable laminar dentures with acrylic base and retaining bent metal clasps were manufactured according to clinical indications. All patients gave their free and informed consent to participate in the study.

The masticatory efficiency was determined using the author's method based on the principle of graphical analysis of fragments of the agar-agar masticatory sample with subsequent programmed calculation and computer processing of numerical data.

The evaluation indicators were as follows: the total number of fragments of the chewing sample and the number of fragments with a fraction of 500-1000 pixel^2.

Statistical analysis of the results was conducted using the Statistica 10.0 software package for Windows, and it embraced the following:

1. Assessing the distribution of values and their correspondence to the normal one in the population.

2. Comparison of the results obtained before applying a removable dental prosthesis and 30 days after its application.

3. Intergroup comparison of the results.

Thus, we observed an increase in the chewing sample parameters in the period from the beginning of orthopedic treatment until the 30th day of observation after applying a partial removable laminar denture. Despite the general trend, in the group of patients with ACVD, the masticatory efficiency was lower than that of the control group, which is confirmed by the difference between the total number of fragments (<17.22) and the number of fragments with a caliber of 500 to 1000 pixel^2 (<4.41). In our opinion, this is due to the peculiarities of adaptation processes in patients with ACVD, who present with a much longer period than patients without a somatic pathology.

The study revealed that the masticatory efficiency, restored by prosthetics with removable laminar dentures in the group of patients with a complicated course of ACVD by hemitype, one month after treatment is at the level of 88.68 (total number of fragments of the chewing sample) and 17.04 (number of fragments with a caliber of 500-1000 pixel^2), which is a relatively worse indicator as compared to the control group. Thus, the total period of orthopedic rehabilitation for patients with ACVD is longer.

Key words: masticatory efficiency; partial removable prostheses; acute cerebrovascular disorder; dentition defects; orthopedic rehabilitation.

Introduction. The attention of dental researchers is constantly focused on assessing the quality of treatment for various pathologies of the dentoalveolar system, determining disorders of occlusal correlations, treatment, and prevention of diseases of the temporomandibular joint and periodontal tissue pathology [1 - 3]. Numerous studies on the above aspects contain information on the characteristics of masticatory efficiency as one of the most vivid markers of orthopedic treatment, as it allows dentists to determine the quality of actual masticatory performance [4 - 7]. At present, the issues of functional diagnostics at the stages of rehabilitation of patients with partial defects of the dentition remain relevant, and therefore, the indicators of masticatory efficiency in prosthetics with removable dentures will be one of the most important criteria for adaptation to them. The situation exacerbates when such patients suffer from somatic pathologies of a neurological nature, in particular, acute cerebrovascular disorder (ACVD) [8]. We set the aim of our study taking into account the lack of information in the available research literature on the features of rehabilitation of such patients using removable dental prostheses.

The aim of the research is to study the features of masticatory function in patients with a complicated course of acute cerebrovascular disorder with the neurological deficit by hemitype.

Materials and methods. The study involved 25 people with a complicated course of ACVD with the neurological deficit by hemitype and 20 people from the control group, aged from 40 to 65 years, for whom partial removable laminar dentures with acrylic base and retaining bent metal clasps were manufactured according to clinical indications. The selection criteria for the study group were: preliminary examination and treatment at the neurosurgical and neurological departments of the municipal enterprise "M.V. Sklifosovskyi Poltava Regional Clinical Hospital of Poltava Regional Council", as well as presentation for dental prosthetics to the Orthopedic Department of the Educational and Research Medical Dental Center of Ukrainian Medical Stomatological Academy.

For the purpose of objective statistical evaluation of patients, they were evenly distributed according to their sex: 24 women (53%) and 21 men (47%).

We determined the masticatory efficiency using the author's method "Patent of Ukraine for a utility model" 135796 as of 25.07.2019 "Method for sedimentational determination of the masticatory efficiency of the chewing sample material", based on the principle of graphical analysis of fragments of the agar-agar masticatory sample with subsequent programmed calculation and computer processing of numerical data [9 - 12] (Fig. 1).

Fig.1. Macrophotograph of a sample to determine masticatory efficiency

The evaluation indicators were as follows: the total number of fragments of the chewing sample and the number of fragments with a fraction of 500-1000 pixel^2.

Statistical analysis of the results was conducted using the Statistica 10.0 software package for Windows, and it embraced the following:

1. Assessing the distribution of values and their correspondence to the normal one in the population.

2. Comparison of the results obtained before applying a removable dental prosthesis and 30 days after its application.

3. Intergroup comparison of the results (Table 1).

Results of the research

Evaluation of masticatory efficacy in groups of patients with complicated ACVD before orthopedic treatment provided the following results: the average total number of fragments of the chewing sample was 25.92 (Std.Err. – 1.675), with a range of values from 14.00 to 43.00.

On the 30th day after prosthetics, this figure was 88.68 (Std. Err. – 3.662), with minimum and maximum values of 64.00 and 138.00, respectively. Therefore, the total number of fragments of the chewing sample increased by 62.76.

Before applying a removable dental prosthesis, the number of fragments of the chewing sample with a caliber of 500 to 1000 pixel^2 in the group of patients with ACVD was at the level of 5.16 (Std.Err. - 0.502), and its values ranged from 2.00 to 11.00. However, on the 30th day of observation, the average number of such fragments of the chewing sample increased up to 17.04 (Std.Err. – 1.093), in the range from minimum to maximum 9.00 and

28, respectively, and this trend coincides with the results of determining the total number of fragments.

Table 1

The results of the chewing sample

The studied variables	Valid N	Mean	Minimum	Maximum	Std.Dev.
The total number of fragments before applying a denture in patients with ACVD	25	25.9200	14.00000	43.0000	8.37616
The total number of fragments before applying a denture in patients of the control group	20	45.1000	16.00000	85.0000	14.72520
The total number of fragments 30 days after applying a denture in patients with ACVD	25	88.6800	64.00000	138.0000	18.30920
The total number of fragments 30 days after applying a denture in patients of the control group	20	105.9000	73.00000	160.0000	29.44379
The number of fragments sized 500-1000 $pixel^2$ before applying a denture in patients with ACVD	25	5.1600	2.00000	11.0000	2.51131
The number of fragments sized 500-1000 $pixel^2$ before applying a denture in patients of the control group	20	5.7500	1.00000	14.0000	3.02403
The number of fragments sized 500-1000 $pixel^2$ 30 days after applying a denture in patients with ACVD	25	17.0400	9.00000	28.0000	5.46565
The number of fragments sized 500-1000 $pixel^2$ 30 days after applying a denture in patients of the control group	20	21.4500	9.00000	36.0000	8.12064

During the sampling, we found that before orthopedic treatment in the control group, the average total number of chewing fragments was 45.10 (Std.Err. – 3.293), with the range of this indicator from 16.00 to 85.00. On the 30th day after prosthetics, the value of the total number of fragments in this group increased by 60.80 up to 105.90 (Std.Err. – 6.584). At the same time, the minimum value of the indicator was 73.00, whereas the maximum was 160.

The number of fragments of the chewing sample with a caliber from 500 to 1000 $pixel^2$ in the control group before orthopedic treatment equaled 5.75 (Std.Err. - 0.676), and the value of this indicator ranged from 1.00 to 14.00. On the 30th day, the above indicator increased up to 21.45 (Std.Err. - 1.816), and it ranged from 9.00 to 36.00.

Thus, we observed an increase in the chewing sample parameters in the period from the beginning of orthopedic treatment until the 30th day of observation after applying a partial removable laminar denture. Despite the general trend, in the group of patients with ACVD,

the masticatory efficiency was lower than that of the control group, which is confirmed by the difference between the total number of fragments (<17.22) and the number of fragments with a caliber of 500 to 1000 pixel^2 (< 4.41). In our opinion, this is due to the peculiarities of adaptation processes in patients with ACVD, who present with a much longer period than patients without a somatic pathology.

Conclusions. Masticatory efficiency, restored by prosthetics with removable laminar dentures in the group of patients with a complicated course of ACVD by hemitype, one month after treatment is at the level of 88.68 (total number of fragments of the chewing sample) and 17.04 (number of fragments with a caliber of 500-1000 pixel^2), which is a relatively worse indicator as compared to the control group. Thus, the total period of orthopedic rehabilitation for patients with ACVD is longer.

Prospects for further research are to increase the number of examined patients and extend the duration of their observation.

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