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Comparison of Two Methods of Setting Artificial Teeth in Dentures Using Electromasticatiography

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Abstract
Aim: *To evaluate the influence of the method of setting artificial teeth in dentures on the masticatory efficiency.*
Material and method: *The studies were performed in three groups of respondents: group 1 consisted of patients with intact dentition and without any pathological changes in other parts of the masticatory complex (n=45), also referred as control group; group 2 consisted of patients with dentures in which artificial teeth were set according to the classical Gisy method (n=10); and group 3 consisted of patients with dentures in which artificial teeth were set according to contemporary method by applying biological principles (n=10).*
Results: *Respondents from group 2, are chewing with 41% masticatory efficiency, whereas respondents from group 3 are chewing with 49% masticatory efficiency, compared with the control group.*
Conclusions: *From this study we can conclude that the method of setting artificial teeth definitely have influence on the masticatory efficiency of the dentures.*
Keywords: *mastication, electromasticatiography, masticatory efficiency*

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I. Introduction

In contemporary prosthodontics more attention is being given to the biological foundations. When the artificial teeth are places in the dentures there are several methods that can be used by the dental technician. One of them is the classical Gysi theory of artificial tooth placement strictly adheres to static rules. And another one is the contemporary theory with implemented biological principles applies biological indicators when setting the artificial teeth in dentures (Picture 1).

Picture 1 Dentures

Their differences relate to the placement of the lateral teeth. With the contemporary method, in the first preliminary stage all the occlusal cusps lie on the oriental prosthetic plane. While in the second, definitive phase, by tilting the longitudinal axes of the artificial teeth in the sagittal and transversal plane, they form individual sagittal and transverse compensatory curves which are consistent with the values of the sagittal and transverse condylar route [1].

Mastication is defined as an act of chewing food, representing the initial stage of digestion, when food is rubbed on small particles to facilitate swallowing.

Mastication is an active process performed by rhythmic contractions of the masticatory muscles *(m. temporalis, m. masseter, m. pterygoideus medialis et lateralis)* and mimic muscles *(m. orbicularis oris, m incizivus, m. quadratus labii superior, m. risorius, m. depressor anguli oris, m. depressor labii inferioris, m. mentalis, m. buccinator)[2]*.

Mastication consists of rhythmic and well-controlled separations and mergers of the maxillary and mandibular teeth. Each opening and closing movement of the mandible represents a chewing stroke. The whole masticatory act is classiefied in 5 different stages [3].

II. Aim Of Study

- *To determine the masticatory efficacy by performing a specific mastication task in subjects with neutroocclusion and without any pathological changes to other components of the masticatory system (CONTROL GROUP). The average values from the test of the masticatory efficiency will represent the REFERENCE VALUES of the control group.*
- *To determine whether there are differences in the masticatory efficiency between the control group and the two examined groups (edentulous subjects wearing dentures)*
- *To get aknowledgements about the influence of two different methods of setting artificial teeth in dentures on the masticatory efficiency of the dentures.*

III. Materials And Methods

The study was conducted at the University Dental Clinical Center "St. Panteleimon" and the Institute of Medical and Experimental Physiology, Medical Faculty. The tests were conducted in 65 subjects. Respondents were clinically examined and analyzed. Besides that, impressions from both jaws were taken for study-models.

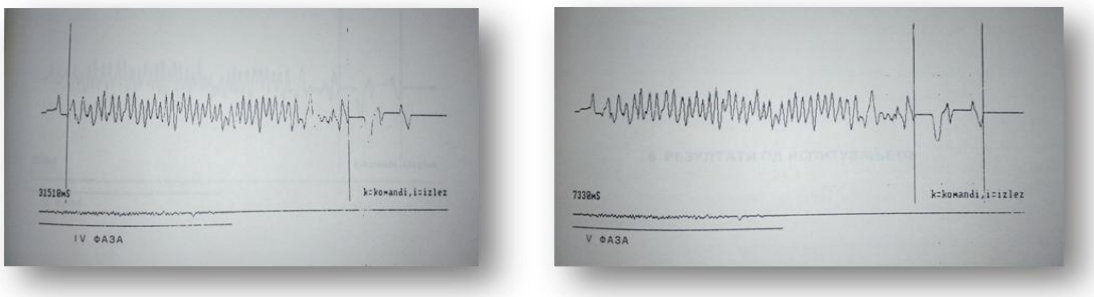
The studies were performed in three groups of respondents: group 1 consisted of patients with intact dentition and without any pathological changes in other parts of the masticatory complex (n=45), also referred as control group; group 2 consisted of patients with dentures in which artificial teeth were set according to the classical Gisy method (n=10); and group 3 consisted of patients with dentures in which artificial teeth were set according to contemporary method by applying biological principles (n=10).

To examine the masticatory efficiency computer electromasticatiography was performed, using a test-food (nut=2,5g). Electromasticatiography is a graphical method for processing the registered movements of the lower jaw, as well as masticatory muscles, during the process of mastication.

The masticatory efficiency was determined by the frequency of chewing cycles and time of mastication, necessary for the food to be crushed into small particles, homogenized, formed into a bolus and the swallowing reflex to occur.

IV. Results

According to the results, the mechanical food cutting (IIIrd fase of mastication) in the control group is performed in 0,62 s and 1,3 chewing cycles, while food grinding (IVth fase of mastication) is performed in 33s and 40 chewing cycles (Picture 2). Respondents from group 2, are chewing with 41% masticatory efficiency, whereas respondents from group 3 are chewing with 49% masticatory efficiency, compared with the control group (Graphic 1).

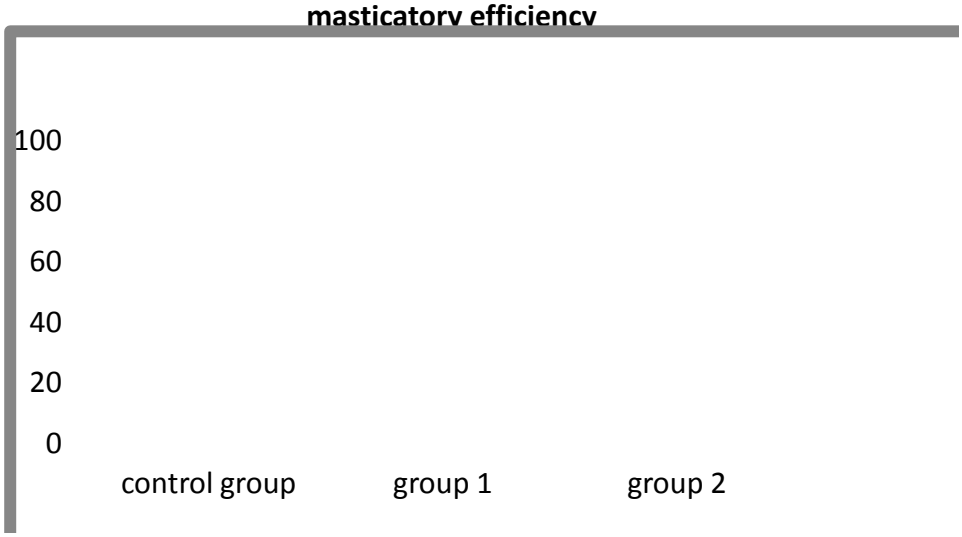


Picture 2 *Phase IV and V of mastication in control group*

As we have mentioned in the introduction, with the contemporary method, in the first preliminary stage all the occlusal cusps lie on the oriental prosthetic plane. While in the second, definitive phase, by tilting the

longitudinal axes of the artificial teeth in the sagittal and transversal plane, they form individual sagittal and transverse compensatory curves which are consistent with the values of the sagittal and transverse condylar route. Therefore, the values for frequency of chewing cycles and time of mastication in respondents of group 2 are better compared with the values of frequency of chewing cycles and time of mastication in respondents of group 1.

The results shows that this method of setting teeth with biological principles has a better influence on the masticatory efficiency in subjects who wears dentures.



Graphic 1 Masticatory efficiency of group 1 and group 2 compared with the control group

V. CONCLUSIONS

From this study we can conclude that the method of setting artificial teeth definitely have influence on the masticatory efficiency of the dentures.

Test has shown that there is a significant correlation between the method of setting teeth in dentures with its masticatory efficiency.

This study proves that the respondents whose teeth are set according to the contemporary method by applying biological principles are chewing with better masticatory efficiency.

In other words, the implementation of biological principles during teeth setting in dentures has an essential impact of the masticatory act.

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