

CorelationBetween The Masticatory Efficiency And Type Of Mastication

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Abstract

Aim: To evaluate the influence of the type of mastication (temporal and masseteric) on the functional state of the masticatory system.

Material and method: The examinations were conducted at the Institute of Medical and Experimental Physiology, Faculty of Medicine in Skopje. The study included 96 respondents (35 males and 63 females). The type of mastication is determined by examining the biopotentials of the masseter and temporal muscles of the subjects. Subsequently, their masticatory efficiency with determined using a specially constructed instrument, ELECTROMASTICIOGRAPH, which graphically processes and records the mandible movements and the chewing muscles during the masticatory act. The mechanical efficacy is determined by the number of chewing cycles and the time of mastication. Walnuts with a precise weight of 2.5 grams were used as a test-food.

Results: The obtained results from this study showed that subjects with masseteric type of mastication, performed the mechanical crushing of the food in 3.64 milliseconds and during 2 chewing cycles. Also, these subjects perform their grinding phase of the food in a period of 2.55 milliseconds and 3 chewable cycles. On the other hand, subjects with temporal type of mastication, perform the mechanical crushing phase in 6.16 milliseconds and during 3 chewing cycles. These subjects performed their grinding phase in a period of 4.06 milliseconds and 2.31 chewing cycles. Their correlation was calculated by linear regression coefficients.

Conclusions: The results that were gained in this study showed significant differences in the masticatory efficiency of both examined groups. In fact, the speed of the masticatory act is greater in subjects with masseteric type compared to those with temporal type of mastication.

Keywords: mastication, electromasticiography, masticatory muscles, temporal type, masseteric type

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I. Introduction

The mastication is a complex act consisting of mechanical, biochemical and physiological processing of the food. The mechanical processing is performed in 5 phases [1], using the force of the masticatory muscles (Picture 1).

According to the contemporary beliefs for the physiology of mastication, there are two basic types of mastication: the masseteric type and the temporal type [2].

The type of mastication of a subject is determined by the muscle activity of masticatory muscles and mandible movements. The masseteric type of mastication performs contraction mostly in the masseteric muscles. So during the chewing of the food, horizontal (lateral) movements of the mandible dominate in the transversal plane.

Picture 1



Since the masseteric muscle is a large, strong masticatory muscle, great chewing force is developed in the masticatory act, which results with quality in masticatory efficiency in the mechanical processing of food.

Extraorally, the main clinical sign for recognition od this type of mastication is its characteristic chin rotationswhile performing the masticatory act, whereas intraorally, significant teeth abrasion on cusps of the occlusal surface is noticed, increasing with age.

The temporal type of mastication performs bilateral contraction of the temporal muscles. So during the chewing of the food, vertical movements od mandible dominate. Most common clinical signs are high cusps with deep fissures of the occlusal teeth surface and presence of deep bite.

The masticatory efficiency in the mechanical processing of the food,in subjects with temporal type of mastication has less quality.

The functional evaluation of the masticatory system can be made by several different methods [3]. The electromasticatiography is one of them. It is an objective, graphic method for registration of the mandibular movements and the activity of masticatory muscles.

II. Aim Of Study

The aim of this study was to evaluate the influence of the type of mastication on the functional state of the masticatory system.

Also, to determine the masticatory efficiency in subjects with temporal type of mastication, a well as in subjects with masseter type of mastication.

To acknowlage if functional differences in masticatory function exist between the two types of mastication.

III. Matherials And Methods

The examinations were conducted at the Institute of Medical and Experimental Physiology, Faculty of Medicine in Skopje. The study included 96 respondents (35 males and 63 females).

The type of mastication is determined by examining the biopotentials of the masseter and temporal muscles of the subjects. Subsequently, their masticatory efficiency with determined using a specially constructed instrument, ELECTROMASTICIOGRAPH, which graphically processes and records the mandibulemovements and the chewing muscles during the masticatory act.

The masticatory efficacy is determined by the number of chewing cycles and the time of mastication that is required to start chewing the test-food, to homogenize it and the swallowing reflex to occur.

Their connection to the III and IV stages of mastication is the peak coefficient $y = ax + b$, where y is the number of chewing cycles, while the x is the duration expressed in milliseconds.

In order to evaluate the masticatory function, it is necessary to performa specific functional task. As a test food, a walnuts with a precise weight of 2 grams was used(**Picture 2**).



Picture 2

IV. Results

The obtained results (**Table 1**)from this study showed that subjects with masseteric type of mastication, peformed the mechanical crushing of the food in 3.64 milliseconds and during 2 chewing cycles. Also, these subjects performtheir grinding phase of the food in a period of 2.55 milliseconds and 3 chewable cycles.

On the other hand, subjects with temporal type of mastication, perform the mechanical crushing phase in 6.16 milliseconds and during 3 chewing cycles.These subjects performed their grinding phase in a period of 4.06 milliseconds and 2chewing cycles. Their correlation was calculated by linear regression coefficients.

	Mechanical phase		Grinding phase	
Masseteric type	3,64ms	2 chew.cycles	2,55ms	3 chew.cycles
Temporal type	6,16ms	3 chew.cycles	4,06ms	2 chew.cycles

Table 1

V. Conclusions

The results that were gained in this study showed significant differences in the masticatory efficiency of both examined groups.

As a conclusion, the speed of the masticatory act is greater in subjects with masseteric type compared to those with temporal type of mastication.

According to the results, the massetric muscles are stronger masticatory muscles, than temporal muscles.

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