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# METHOD MODIFICATION FOR STUDYING OF ORAL FLUID MICRO-CRYSTALLIZATION FOR PATIENTS WITH PURULENT-INFLAMMATORY DISEASES IN CRANIO-MAXILLOFACIAL AREA

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The test of oral fluid microcrystalization is well known and is widely used as additional method for diseases in cranio-maxillofacial area testing [1,3]. Many authors underlined its simplicity, objective character, reliability, repeatability and absolute innocence. The fact that this test has no recurrent, physiological or other restrictions is very important [2]. Oral fluid is one of the liquid mediums of human body. It provides homeostasis of organs characteristics and there compositions, tissues of the oral cavity [3]. In many literature sources it is mentioned that tissues of the oral cavity and oral fluid are in dynamic balance. So, pathological processes arising and developing in cranio-maxillofacial area can influence on the quantitative and qualitative data of the oral fluid. Many authors told about changes of that physical index of the natural biological medium of the oral cavity while diseases in cranio-maxillofacial area. But till now changes of the oral fluid microcrystalization while arising and developing of purulent and inflammatory diseases in cranio-maxillofacial area are not practically studied. In fact, there are no manuscripts about different morphological characteristics of crystalline rete of a drop of the oral fluid depending on nosology. Last time, the nature of purulent-inflammatory processes is changed. Hard forms of the purulent infections when it is sweeping on some anatomic areas are often met in very day practice, for example, complications as septicaemia, mediastinitis, septic, asphyksia and other [4]. During examination of the oral fluid microcrystallization for patients with purulent-inflammatory diseases in cranio-maxillofacial area and of changes of that physical index while treatment course, in the frame of the same samples of the oral fluid we have mentioned two types, in some cases - three types of the microcrystallization. Taking into consideration that this fact can have negative effects on the prognostics, diagnostics and finally on the treatment course, we had necessity to modify that test for patients testing with purulent-inflammatory diseases in cranio-maxillofacial area.

## Aim of this work

is to modify the method of studying of the oral fluid microcrystalization and its application for patients with purulent inflammatory diseases in cranio-maxillofacial area.

## Materials and methods

We have examined 43 patients at the age of 16-36 years old with purulent-inflammatory diseases in cranio-maxillofacial area which passed the treatment course in the 2nd department of cranio-maxillofacial surgery in the hospital ? 9 of Minsk at the period from 1999 to 2005 years. According to the nosology and localization of the purulent-inflammatory processes, all patients were divided into two groups. I-st group (22 patients) was represented by patients with ptherygoideus mabdibularis. II-nd group (21 patients) was composed of patients with mylohyoideus area abscess. Group of control composed of 24 practically healthy people. While examination we have paid attention on the fact that total status of the patient and some aspects of the oral cavity could influence on the composition and properties of the oral fluid. All patients had no systemic diseases, injuries, operations which demand rehabilitation course in the past history. Pathology of the mucous tunic of the oral cavity was excluded. There was not found teeth anomalous position and jaw development, false teeth, amalgam temporary stopping were lacking. All patients had middle and high level of caries intensity. These patients correlation was equal. Methods by P.A.Leus (1977) [5] have been used to study prepared samples for microcrystalization examination of the oral fluid. Oral fluid was gathered in oral cavity by sterile pipette. After that three drops of the oral fluid have been put on a glass. Made samples of the oral fluid were dried with standard room temperature. After, they were examined under microscope with magnification of 10 which let see the content of the whole drop. Type of microcrystallization was established according to the indexes by L.A.Dubrovina (1988) [3]. As a result we have taken the pictures of the drops which we have met twice on the same glass. First type of microcrystallization was represented by long, prismatic, radial form crystals. Second type crystals were as isothermal ones, without clear orientation. Third type - separated, small, alone, non oriented crystals. In order to appreciate the received results we have divided every drop in four sectarians (I, II, III, IV). Also, we have determined the type of microcrystalization of the oral fluid for every sectarian and have calculated the arithmetic mean of the microcrystallization of every drop of the oral fluid by formula:
where:

$$M = \frac{a1 + a2 + a3 + a4}{4}$$

M - arithmetic mean of the microcrystallization of a drop of the oral fluid; a1, a2, a3, a4 - microcrystallization index of a sectarian of the oral fluid drop; 4 - quantity of the examined sectarians.
Arithmetic mean was calculated for three indexes in every sample. All data received while the experiment have been worked up on the PC "Pentium 4" in "Microsoft Excel".

## Results and discussions

Examination results data received by method of microcrystalization study of the oral fluid by P.A.Leus showed all patients have three types of microcrystallization of the oral fluid. First type of microcrystalization have been determined for three persons (7% from the total number of examined patients), second type - for 11 persons (26%), third type - for 29 persons (67%). Microcrystallization types of the oral fluid are classified in the patients groups according

| Patients groups | Type of oral fluide microcrystallization | Frequency |
|---|---|---|
| I-st group (ptherygoideus mabdibularis) | I type | 9,1% |
| | II type | 27,3% |
| | III type | 63,6% |
| II-nd group (mylohyoideus area abscess) | I type | 4,8% |
| | II type | 23,8% |
| | III type | 71,4% |

**TABLE 1. Microcristallization types of the oral fluid classified in the patients groups according to the nosology and localization of the purulent-inflammatory processes.**

| Patients groups | Average means of the microcristallization data of the oral fluid | Frequency |
|---|---|---|
| I-st group (ptherygoideus mabdibularis) | from 1 to 1,44 | 4,6% |
| | from 1,45 to 2,44 | 31,8% |
| | from 2,45 to 3 | 63,6% |
| II-nd group (mylohyoideus area abscess) | from 1 to 1,44 | 4,8% |
| | from 1,45 to 2,44 | 33,3% |
| | from 2,45 to 3 | 64,9% |

**TABLE 2. Average means of the microcristallization data of the oral fluid in groups of patients according to the nosology and localization of the purulent-inflammatory processes of the cranio-maxillofacial area.**

to the nosology and localization of the purulent-inflammatory processes (see TABLE 1). Average means of the microcrystallization data of the oral fluid in groups of patients according to the nosology and localization of the purulent-inflammatory processes and received while examination made by ourselves are classified in the TABLE 2. Authentic difference from the control data 2,12±0,13 which made $p<0,01$ for the patients of the I-st group and $p<0,001$ for the patients of the II-nd group was found during examination in modification [5] of the data for both patients groups. When we used our own modification, difference with data of control made $p<0,001$ for patients of the I-st and II-nd groups. Authentic difference was not found in both variants of examination when we have compared microcristallization data of the oral fluid of the examined groups of patients. But clear tendency ($t=1,83$) was evident to the lowest degree crystals organization of the oral fluid for the patients of the II-nd group. Comparative appreciation of the microcrystallization data of the I-st and II-nd groups patients during different modifications of the examination showed the tendency to the authentic difference of the received data according to the results of the I-st group and significant difference $p<0,05$ according to the received data of the II-nd group.

## Conclusion

According to the mentioned above information we see more of authenticity and objectivity of our modification for microcrystallization examination of the oral fluid for patients with purulent inflammatory processes in cranio-maxillofacial area. It is to be used widely in practice medicine and research work.

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# DEVELOPMENT OF NEW DESIGN OF THE ACETABULAR COMPONENT FOR TOTAL HIP REPLACEMENT

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## Introduction

As yet used total replacements of a hip joint take some negative events that influence endurance of total replacement. The aim our effort is evolution of a new design of an acetabular component of a total replacement of a hip joint that those negative events will minimize or eliminate in a better case. New shape of cup is symmetrical towards the hip joint stress. This cup was designed based on a mathematical models of a distribution of contact stress. We used finite element method for a verification of a new design of a hip cup. We compute with the finite element method distribution of the contact stress on the acetabular surface. We evaluate computed models based on results of the contact stress distribution on the acetabular surface and we have effort to achieve the most homogenous contact stress distribution and reduction of maximal value contact stress.

## Materials and methods

We used mathematical models of a contact stress distribution [1,2,3,4] for a determination of a contact stress distribution with an indirect measuring. Three basic mathematical models of the contact stress distribution was derived. It was a mathematical model with uniform a contact stress distribution, a model with linear descent of a contact pressure in a plane perpendicular to a resultant hip joint force and a model with a cosinus distribution of a contact stress [5]. From these three basic models, the model with the cosinus contact stress distribution on the acetabular surface (FIG.1) was chose as suitable.
We compared the results of the contact stress distribution