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INDICATORS OF TRYPSIN-LIKE ACTIVITY OF MIXED SALIVAAFTER INSTALLING THE ENDOSSEOUS IMPLANTS IN THE PRESENCE OF GASTRIC ULCER AND DUODENAL ULCER

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ABSTRACT

The trypsin-like activity of mixed saliva in orthopedic patients after implant placement was monitored. Proved negative impact on the processes of repair of background somatic pathology (peptic ulcers and 12 duodenal ulcers), justify the application of immunomodulator "Erbisol" as a drug that speeds up the repair processes during implantation. At present, the relevant issues are those related to the development of inflammatory complications at the stage of rehabilitation of patients, especially in the presence of somatic pathology and the study of the tissue complex of the implantation zone. Peptic ulcer disease occupies one of the main places in the structure of lesions of the digestive system. The close interdependence between the pathology of internal organs and the oral cavity is confirmed by numerous observations and studies.Implant placement is accompanied by changes in the enzymatic activity of mixed saliva. The presence of somatic pathology (ulcerative disease of the stomach and 12 duodenal ulcers) often leads to more long-term violations of the enzymatic activity of saliva. The use of the drug "Erbisol" in orthopedic dentistry accelerates the repair process, as evidenced by the earlier periods of normalization of the enzymatic activity of mixed saliva, after the installation of implants.Regular and timely monitoring of the condition of the periarticular tissues, as well as objective diagnosis of early inflammatory complications, are necessary to ensure the reliability and long-term functioning of prosthetic structures installed on implants in the oral cavity.It can be concluded that the purpose of our study was to study the trypsin-like activity (TPA) of mixed saliva after implant placement on the background of somatic pathology.

Keywords: *trypsin-like activity mixed saliva implants.*

1. INTRODUCTION

Dental implantology is a multidisciplinary specialty. Due to its knowledge intensity and integrative potential, it is experiencing rapid development. Treatment of patients with the use of implants is of great interest to both specialists and a large number of patients.

Over the past three decades, this type of treatment has been successfully used in many countries of the world. In Russia, dental implantology began to develop somewhat later than in other countries, however, at the state level solved many problems that contribute to the successful development of this section of dentistry.

The use of dental implants in dental practice has allowed a qualitatively new level to solve the problem of orthopedic treatment of patients with dentition defects (Matsui, 2015; David Y. Graham, 2014; Bonet-Costa, 2019; Kumar, 2019; Aviñó, 2019; Berryman, 2019).

In the practice of dental implantology, the issues related to the study of the tissue complex of the implantation zone and the development of inflammatory complications at the stage of rehabilitation of patients, especially in the presence of somatic pathology, are still relevant (Cleaver, 2019; Mangine, 2019; Pitchford, 2019; Yanushevish, 2019). In the structure of lesions of the digestive system, one of the main places is occupied by peptic ulcers. Numerous observations and studies have confirmed the close interdependence between the pathology of internal organs and the oral cavity and the need for a broad General clinical approach to the study of these diseases (Liu, 2019; Preau, 2019; Gao, 2019; Voloshina, 2018).

To ensure the reliability and long-term functioning of prosthetic structures installed on implants in the oral cavity, it is necessary to regularly and timely monitor the state of the near-implant tissues, as well as objective diagnosis of early inflammatory complications (Sourabh, 2019; Petrovic, 2019; Roldán-Padrón, 2019; Evstratenko, 2018).

Orthopedic treatment was carried out using a two-stage procedure of implant endosseous screw implants U-Impl. When using collapsible (two-stage) implants by a one-stage method, it is desirable that their configuration provides for a smooth cylindrical neck with a height of 1.5-2.0 mm, (for implants with an internal connection). The implant is installed so that the orthopedic platform rises above the level of the bone ridge by 1.5-2.0 mm or more. When using two-stage implants, if there are conditions for immediate loading, it is desirable to install permanent abutments, especially in aesthetically important areas. Two-stage implantation involves the installation of all elements of the implant structure in stages. At the first stage, the intraosseous element is installed. After the implant is placed, a mucosal flap is sutured over it. Passes closed engraftment of the implant (not communicating with the oral cavity).

Closed engraftment is: without load (when the implant is located below the top of the alveolar ridge or at the level of the alveolar ridge), with load (when the implant is located above the top of the alveolar ridge). The period of engraftment of two-stage implants on the upper jaw is 4-6 months, on the lower jaw is 2-3 months.

The studies were carried out on the spectrophotometer DR-3900 (HACH-LANGE, Germany) (Figure. 1), which allows you to keep under control the entire measurement process, from sampling and ending with the preservation of the result.

The powerful system of registration of samples and operators is complemented by the technology of wireless tags – RFID (radio frequency identification).

The packaging of the test cells also receives an RFID tag containing information about the measurement process and shelf life. When changing the measurement process, the device considers the information on its own (Sevbitov, 2019; Kuznetsova, 2019; Shchetinin, 2019); .

The measurement results are easy to read on the large color touch screen. An intelligent sample and user accounting system allows you to monitor the sample analysis process.

The device is equipped with quality control programs AQA + analysis. At any time, the user can check the correctness of the results, the accuracy of the pipette, the correct dilution. Current batch certificates (to document GMP/GLP results) are located in the RFID tag

on the cuvette package. The RFID technology allows you to instantly display the DR 3900 and print all the information on a particular batch.

Based on the above, the aim of our study was to study the trypsin-like activity (TPA) of mixed saliva after implant placement on the background of somatic pathology (Tsakiri, 2019; Zhong, 2019; Tsalikis, 2019; Magnen, 2019; Greenwood, 2019).

2. MATERIALS AND METHODS

All research methods under this article have been conducted in accordance with the relevant guidelines and regulations. The quality of scientific research is achieved by observing the principles. The component of the purposefulness-the study is carried out in accordance with the objectives of improving the practice of education, the approval of the relations of humanity in it. The component of objectivity-theoretical models in the study should reflect the real pedagogical objects and processes in their multidimensionality and diversity. The component of applied orientation-the results of the study should contribute to the explanation, prediction, and improvement of educational practice in a plurality of ways of its development. The component of consistency-the results of the study are included in the system of scientific knowledge, Supplement the available information with new information. The component of integrity-the components of an educational object is studied in the dynamics of a multidimensional picture of their relationships and interdependencies. The component of dynamism-reveals the patterns of formation and development of the studied educational facilities, the objective nature of their multidimensional and multivariate. These principles are based on the laws of cognitive activity, scientific research and the specifics of educational practice. All experimental protocols were approved by the Local Ethics Committee of I. M. Sechenov First Moscow State Medical University (Sechenov University). Prior to the study, informed consent was obtained from all patients for the upcoming study.

The material of this study was the mixed saliva of patients who underwent dental implantation. Orthopedic treatment was performed using a two-stage method of implantation with U-Impl screw endossal implants (Figure. 2). U-Impl implants are made of titanium class 5 — material with maximum bioinert, the risk of rejection of such implants is minimized, their installation is shown even to allergies. The low weight allows patients to feel these implants as their own teeth — they do not give excessive load on the jaw, and the habituation to them passes quickly and imperceptibly. The surface of the titanium pin implanted into the bone has a porous hydrophilic structure-so that the process of osseointegration is accelerated and takes place more fully. The specific structure of the implant allows the bone substance to hold it more tightly — the degree of fixation is higher than the average. At the point of contact with the abutment implant due to the smoothness of these surfaces is not formed plaque that can provoke inflammation. The special design of the abutment ensures uniform load distribution over the entire area of the implant-the risk of displacements or formation of microcracks is reduced to zero. U-Implant Simpl Swiss dental implants can be used in all cases of dental practice: they are optimally suited for one-stage and two-stage implantation with a preliminary stage of bone augmentation. In both cases, the rate of full survival-one of the highest among modern implant systems. For the study, 87 patients (37 women and 50 men) aged 21 - 64 years were examined. Selecting patients, the General condition of an organism, the transferred and accompanying diseases, an anatomical and physiological condition of an oral cavity were considered.

The patients were divided into 3 groups: the 1st group included orthopedic patients without somatic pathology-20 patients; the 2nd group – orthopedic patients with somatic pathology (gastric ulcer and duodenal ulcer) – 27 patients; group 3 consisted of 25 patients in need of orthopedic care and having background somatic pathology, who were administered 1 ml of the immunomodulator Erbisol intramuscularly every other day during the first 30 days after implantation.

In addition, 15 practically healthy persons (norm) not suffering from dental pathology were examined - the control group. The orthopedic treatment was carried out using a two-stage procedure of implant endosseous screw implants U-Impl. The study used the drug "Erbisol" - immunomodulator, drug, adaptogen. Erbisol is a complex of natural non-protein low molecular weight organic compounds of non-hormonal origin, derived from animal embryonic tissue, containing

glycopeptides, peptides, nucleotides, amino acids in a solution of 0.9% isotonic sodium chloride; dry residue 11-17 mg-/-ml.

This drug contains low-molecular signal fragments of membrane glycoproteins that function as markers of the physiological state of cells, which in pathological disorders of homeostasis activate the immune system. Erbisol drugs affect only unbalanced systems, affected organs, and tissues and remain virtually indifferent to a healthy body, without causing adverse reactions.

Trypsin-like activity (TPA) of mixed saliva in patients was measured by a spectrophotometric DR 3900 method based on the change in the rate of cleavage of N-benzene - L-arginine from the synthetic substrate n-benzene - L-arginine ethyl alcohol (Reanal).

For its implementation, 0.5 ml of saliva was diluted to 2 ml of 0.05 M Tris-HCL buffer (pH-8.0), and after a preincubation period of 5 minutes, 1 ml of BAEE (benzoyl-arginine-ethyl ether) solution was added. The reaction was carried out in a thermostatic cuvette (250 °C) spectrophotometer, registering an increase in optical density at 253 nm at intervals of 5 minutes for 30 minutes against the control sample for spontaneous hydrolysis of BAEE. The activity was calculated by the formula:

TLA = $\Delta D253^{30}$ x 3 / (1.1 x 0.5 x 30) -$\Delta D253^{30}$ μmol/ml, where:

- $\Delta D253^{30}$ is the increase of optical density in 1 ml of the sample at 253 nm within 30 minutes;
- 3 – sample volume (ml);
- 0.5 – the amount of saliva taken for analysis (ml);
- 1.1 – the increase in optical density at 253 nm, corresponding to the formation of 1 μmol BAEE in 1 ml of the sample;
- 30 – reaction time (min).

The results were expressed in micromoles of the hydrolyzed substrate in 1 ml per minute. All the obtained digital material was processed by the method of variation statistics with the derivation of the student's criterion, and the indicators were considered reliable at $p< 0.05$.

3. RESULTS AND DISCUSSION:

By 1 month after the implant placement, all three study groups showed a statistically significant ($p<0.05$) increase (TPA) in the mixed saliva (Diagram. 1), which was apparently a reaction of periodontal tissues to the implantation (Table. 1).

In the subsequent terms after the implant placement, by 3 months, there was a cascade and statistically significant ($p<0.05$-0.01) increase in trypsin-like activity of the mixed saliva in all studied groups of patients, but the most manifest changes were observed in group 2 (orthopedic patients with gastric ulcer and duodenal ulcer), where the TPA of the mixed saliva was 61.86±1.62 μmol/ml x min, which was 29.1 % ($p<0.01$) higher than control groups indicators (Diagram. 2). In the next 6 months after the implantation in the patients of the groups 1 and 3 of observations stabilization and some decrease of enzymatic activity of the mixed saliva which by this term acquired in relation to control unreliable character ($p>0,05$) was noted (Diagram. 3).

At the same time, in the orthopedic patients with somatic pathology, TPA, despite some decrease remained at a high level and amounted to 55.78±1.44 μmol-/-ml ·min, which was 16.4 % ($p<0.05$) higher than the control parameters. In the following (long-term follow-up of 12 months), the trypsin-like activity of mixed saliva in all three study groups approached the control parameters, acquiring a statistically insignificant character in relation to them ($p>0.05$) (Diagram. 4).

4. CONCLUSIONS:

It can be concluded that the implant placement is accompanied by changes in the enzymatic activity of mixed saliva. The presence of somatic pathology (gastric ulcer and 12 duodenal ulcers) leads to more prolonged violations of the enzymatic activity of the saliva. The use of the drug "Erbisol" in orthopedic dentistry accelerates the repair process, as evidenced by the earlier periods of normalization of the enzymatic activity of mixed saliva, after the installation of implants.

5. ACKNOWLEDGMENTS:

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Table 1. *Trypsin-like indicators of mixed saliva in orthopedic patients after implant placement on the background of gastric ulcer and duodenal ulcer (µmol / ml x min).*

Observation group	**Observation period (months)**			
	1	**3**	**6**	**12**
Group 1- Orthopedic patients without somatic pathology n=20	55,84 ± 1,56 p < 0,05	57,34 ± 1,62 p < 0,05	52,24 ± 1,74 p > 0,05	49,15 ± 1,49 p > 0,05
Group 2- Orthopedic patients with somatic pathology n=27	56,07 ± 1,58 p < 0,05	51,86 ± 1,62 p < 0,05	55,78 ± 1,44 p < 0,05	52,77 ± 1,35 p > 0,05
Group 3- Orthopedic patients with somatic pathology using «Erbisol» n=25	55,93 ± 1,64 p < 0,05	58,12 ± 1,82 p < 0,05	53,81 ± 1,44 p > 0,05	50,08 ± 1,82 p > 0,05
Control (healthy) n=15	47,90 ± 1,55			

Figure 1. *Spectrophotometer DR-3900*

Figure 2. *Implant U-Impl*

Diagram 1. *Trypsin-like indicators of mixed saliva in orthopaedic patients 1 month after implant placement on the background of gastric ulcer and duodenal ulcer (mmol / ml x min).*

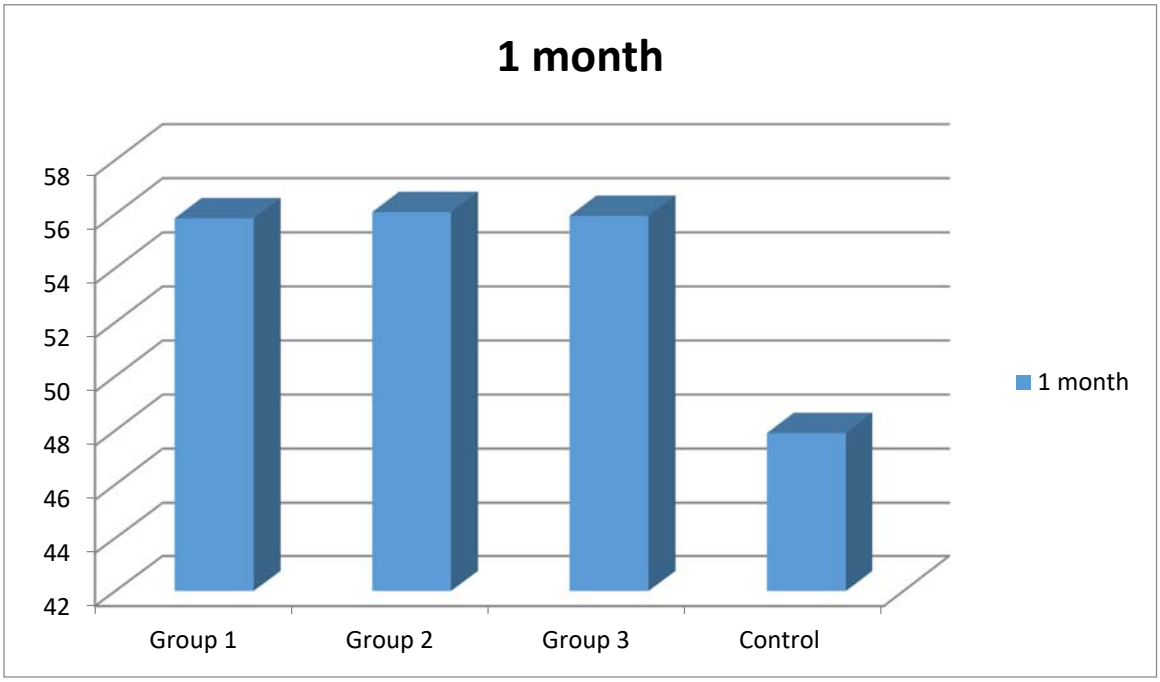

Diagram 2. *Trypsin-like indicators of mixed saliva in orthopaedic patients 3 months after implant placement on the background of gastric ulcer and duodenal ulcer (mmol / ml x min).*

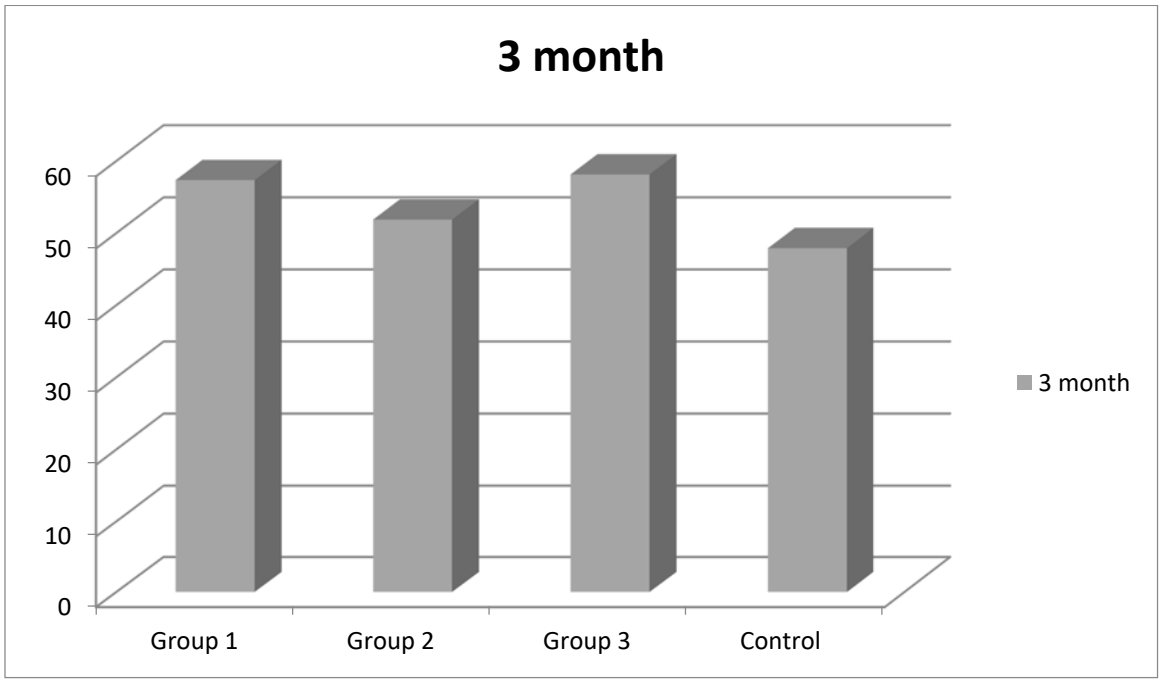

Diagram 3. *Trypsin-like indicators of mixed saliva in orthopaedic patients 6 months after implant placement on the background of gastric ulcer and duodenal ulcer (mmol / ml x min).*

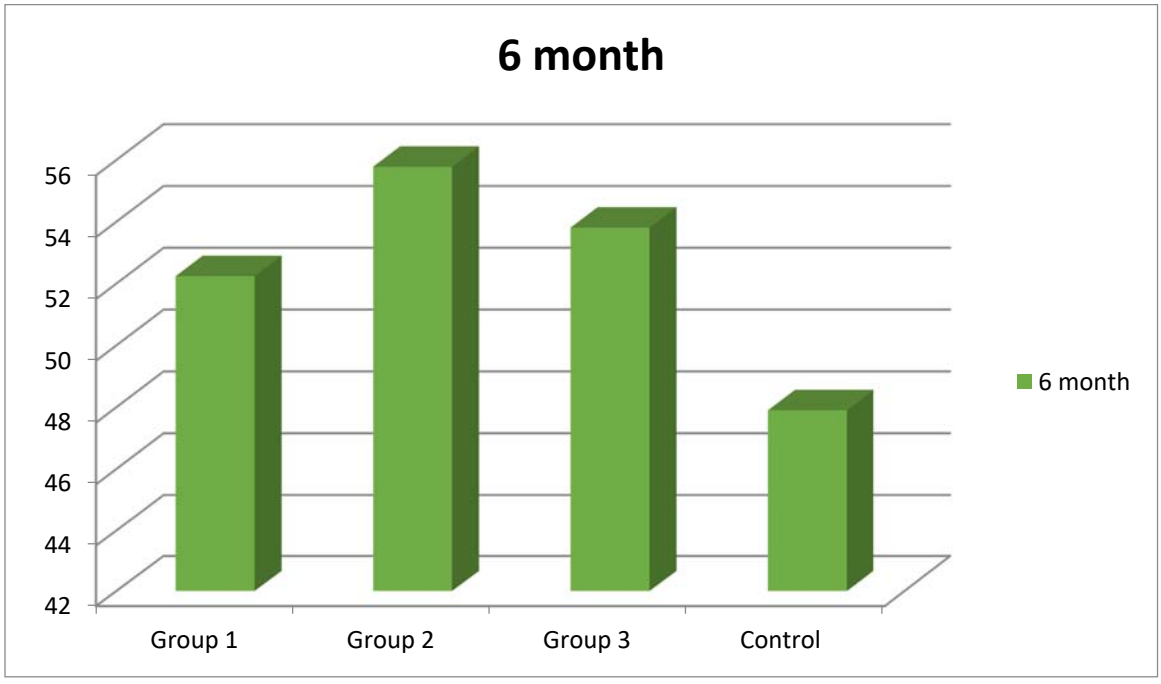

Diagram 4. *Trypsin-like indicators of mixed saliva in orthopaedic patients 12 months after implant placement on the background of gastric ulcer and duodenal ulcer (mmol / ml x min).*