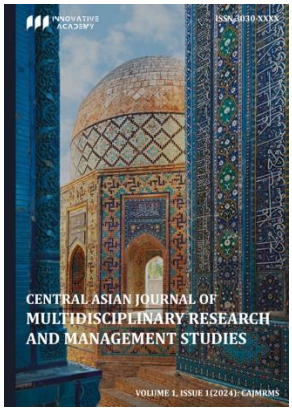

CHANGES IN THE PHYSICAL AND CHEMICAL PROPERTIES OF ORAL FLUID DURING THE PROCESS OF ADAPTATION TO DENTAL PROSTHETICS

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ABSTRACT

In the dental practice of the world, there is a high frequency of various orthopedic and orthodontic defects, including forms manifested in the form of adentia of varying degrees, and the prevalence of adentia has increased significantly and, according to data, is 35.4-62.9%. Of the examined patients, 88.4% require prosthetics using fixed prostheses made of various metal alloys [1,5,9].

It is known that indicators of the mineral composition of mixed saliva indicate the relationship between the potential difference in the oral cavity. Enrichment with mineral and microelements can also occur due to the formation of galvanic pairs between differently polarized areas of the steel prosthesis itself. The authors indicate that under the influence of metal dentures the state of homeostasis of the oral cavity changes, which may be associated with electrochemical processes, and the method of finishing of dentures affects the severity of metabolic disorders in the oral cavity [2,3,6,7,11].

Thus, an analysis of existing achievements in the field of studying the process of adaptation of patients when using dentures showed the lack of a clear understanding of the time parameters of the adaptation process, as well as the dependence of the severity of adaptive changes depending on the material from which the denture is made. Perhaps the use of accessible and informative research methods will allow us to solve a number of problems.

Material and research methods. 102 patients who sought dental orthopedic care at the regional dental clinic of SamSMU were examined, of which 56 were men and 46 women aged 30 to 60 years. The control group consisted of 20 practically healthy individuals who did not use dentures and had all their teeth. All examined patients were divided into groups depending on the treatment performed:

1 – group, 35 patients who received dentures using unsoldered stamped crowns (SC) (124 dentures);

2 – group, 36 patients, prosthetics with metal-ceramic crowns (MC) were performed (42 dentures);

3 – group consisted of 35 patients who underwent prosthetics using zirconium crowns (ZC) (40 prostheses). A total of 206 prostheses were manufactured.

In the clinical diagnostic laboratory of the 1st clinic of SamSMU, the concentration of iron, calcium, potassium, magnesium, sodium, chlorides and phosphates and the pH of the oral fluid was determined, before and after 0.5; 1, 3, 6, 12, 24 and 36 months after prosthetics.

After rinsing the mouth twice with distilled water, oral fluid was collected on an empty stomach or 1-2 hours after eating, by spitting into sterile tubes in a volume of 1.0-2.0 ml and all sterile tubes were hermetically sealed with a stopper, labeled and delivered within 60 minutes to the laboratory for biochemical research.

The concentrations of mineral elements in oral fluid were carried out on a semi-automatic biochemical analyzer "Mindray BA-88A" (China) using the photocolorimetric method using standard sets of reagents from the manufacturer.

Statistical processing of the study results was carried out on a personal computer using Microsoft Excel 11.0 and “Statistica 6.0” using Student’s t-test ($p<0.05$).

Results and its discussion

During a general examination of patients, the presence of visually distinguishable foci of abrasion at occlusal contacts was noted for all types of prostheses (SC, MK and CC) and amounted to 14.6%; 13.1% and 2.8% of cases, respectively. In patients with CC, crown perforation was observed in 8.8% of cases. In 44.2% of these patients, swelling and bleeding of the marginal gums were noted. In contrast to CC in patients with MC and CD, prosthetic structures did not cause pathological changes in the marginal gums at all periods of observation.

When comparing the concentrations of Na+, K+, Ca2+, Mg2+ in the oral fluid of patients in the control group with patients with up to 4 defects in the hard tissues of teeth, partial absence of up to 4 teeth before prosthetics, certain differences are noted that allow us to judge the influence of the number and location of dental defects on the quality indicators of mixed saliva.

In patients with a defect in the hard tissues of the teeth before prosthetics, the concentration of Ca2+ in mixed saliva did not depend on the amount of defect in the hard tissues of the teeth (1.84±0.05 and 1.87±0.08 mmol/l for patients 1-2 and 3-5 defect, respectively) and was significantly higher than the control group (1.74±0.04 mmol/l). In patients with partial absence of 1-3 teeth and partial absence of 3-4 frontal teeth, the calcium concentration in mixed saliva was lower compared to the control group (1.65 ± 0.05 and 1.60 ± 0.03 mmol/l, respectively) (

The concentration of phosphates in mixed saliva in patients with defects of hard dental tissues before prosthetics does not differ from the data in the control group. However, in the groups of patients with partial absence of 1-2 and 3-4 teeth, this indicator was higher than that in the control group (3.64 ± 0.04 and 3.72 ± 0.03 when comparing 3.47 ± 0.03 mmol /l).

In patients with hard tissue defects of 1-2 and 3-5 teeth, the concentration of Mg2+ in mixed saliva exceeds the values of the control group (0.34±0.03 and 0.37±0.02 relative to 0.34±0.02 mmol/l), and in groups with partial absence of 1-2 and 3-4 teeth less than in the control group (0.31±0.01 and 0.3±0.01 mmol/l, respectively) (Fig. 2).

When studying the dynamics of changes in sodium content in patients in the control group, it was revealed that this indicator was 16.2±0.1 mmol/l (Fig. 4). For patients with CC, 15 days after prosthetics, its concentration is 17.5±0.08 mmol/l, after 1 month. - 18.03±0.05 mmol/l, 3 months. - 17.95±0.04 mmol/l, 6 months. - 17.87±0.09 mmol/l, and by 12 and 24 months. -

17.85±0.06 and 17.87±0.05 mmol/l.

In those examined with MC prostheses, the sodium content after 0.5 months. after prosthetics was equal to 16.6±0.06 mmol/l, after 1 month. - 16.8±0.09 mmol/l, 3 months. - 16.9±0.1 mmol/l, 6 months. - 17.2±0.05 mmol/l, 12 and 24 months - 17.1±0.08 and 16.8±0.09 mmol/l, respectively. By the end of the study (36 months), the Na+ concentration was 16.8±0.11 mmol/l.

In those examined with MC prostheses, the potassium content after 0.5 months. after prosthetics was equal to 18.4±0.05 mmol/l, 1 month. - 18.26±0.04 mmol/l, 3 months. - 18.5±0.07 mmol/l, 6 months. - 18.5±0.05 mmol/l, 12 months. - 18.33±0.06 and 24 and 36 months. 18.31±0.07 and 18.57±0.07 mmol/l, respectively.

In the group of patients with CDMC prostheses after 0.5 months. Was equal to 17.9±0.07 mmol/l, 1 month - 18.0±0.04 mmol/l, by 3 months - 18.01±0.06 mmol/l, 6 months. - 18.1±0.08 mmol/l, at 12 and 24 - 17.9±0.06 and 17.8±0.1 mmol/l. By the end of the study, this indicator was 17.96±0.09 mmol/l.

In patients in the control group, the calcium level was 1.8±0.07 mmol/l (Fig. 6). For patients with CC 15 days after prosthetics it is 1.89±0.03 mmol/l, after 1 month. - 1.94±0.02 mmol/l, by 3 months - 1.96±0.01 mmol/l, by 6 months 2.02±0.02 mmol/l, by 12 and 24 months. - 2.08±0.02 and 2.09±0.01 mmol/l. In patients with MCM prostheses after 15 days -1.8±0.02 mmol/l, after 1.3.6 months - 1.77±0.01; 1.85±0.03; 87±0.02 mmol/l, respectively, by 12, 24 and 36 months - 1.89±0.02; 1.86±0.01; 1.85±0.02 mmol/l., respectively

When studying the dynamics of changes in the hydrogen index in patients of the control group, it was revealed that in patients of this group this indicator was 7.24 ± 0.03 (Fig. 8). In patients with CC after 0.5 months. 7.05±0.03, after 1 month. -6.97±0.01, by 3 months after prosthetics 6.95±0.02, by 6 months 6.93±0.02, by 12 and 24 - 6.9±0.01 and 6.89± 0.02 mmol/l. By 36 months, in the group of patients with CC it was 6.9±0.01 mmol/l.

For patients with MCM prostheses, pH 0.5 months after prosthetics was 7.31±0.03, after 1 month - 7.29±0.01, after 3 months - 7.17±0.02, by 6 months - 7.05±0.01, by 12 and 24 - 7.07±0.02 and 7.09±0.02, respectively. By the end of the study, the pH in patients with MCM prostheses was 7.07±0.02.

In patients with CD prostheses, 0.5 months after prosthetics the pH value was 7.31±0.03, after 1 month 7.35±0.02, by 3 months - 7.38±0.02, by 6 months - 7.38±0.01, at 12 and 24 - 7.41±0.02 and 7.4±0.01. By the end of the study, the pH in the group of patients with CDMC prostheses was 7.39±0.02.

Thus, to summarize the data obtained, we can conclude that dentures cause changes in the acid-base balance and mineral composition of mixed saliva, while stamped crowns have the least effect on it; from 12 months after prosthetics until the end of the study, dentures have a slight effect .

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