

Changes in the Physical and Chemical Properties of the Oral Fluid in the Process of Adaptation to Dental Prosthetics

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Abstract Relevance of the topic In the dental practice of the world, there is a high frequency of various orthopedic and orthodontic defects, in the form of manifesting adentia of various degrees, the prevalence of adentia has increased significantly and according to data from leaves 35.4-62.9%. Of the examined patients, 88.4% require prosthetics using fixed prostheses made of various metal alloys [1,5,9]. Anatomical and functional unity of the oral cavity, dentition (3ChS) and salivary glands (SG). cause significant changes in the physicochemical properties of mixed saliva found in dental and somatic pathology [4,8,10]. It is known that the indicators of the mineral composition of mixed saliva indicate a relationship between the potential difference in the oral cavity. Enrichment of the cavity with minerals and microelements can also occur due to the formation of galvanic pairs between differently polarized sections of the steel prosthesis proper. The authors point out that under the influence of metal prostheses, the state of homeostasis of the oral cavity changes, which may be associated with electrochemical processes and the method of finishing processing of dentures affects the severity of metabolic disorders in the oral cavity [2,3,6,7,11]. Thus, the 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 temporal parameters of the adaptation process, as well as the dependence.

Keywords Oral fluid, Stamped crowns, Metal-ceramic crowns, Zirconium crowns

This is an older file format... the severity of adaptive rearrangements, depending on the material from which the denture is made. It is possible that the use of accessible and informative research methods will allow us to solve a number of tasks. Material research methods. We examined 102 patients who applied for dental orthopedic care to the regional dental clinic of SamGosMI, of which 56 were men and 46 were women aged 30 to 60 years. The control group consisted of 20 practically healthy individuals who did not use prostheses and had all their teeth. All examined patients were divided into groups depending on the treatment performed: 1 - group, 35 patients who underwent dentures with non-soldered stamped crowns (SC) (124 dentures); 2 - group, 3b patients, prosthetics with metal-ceramic crowns were performed (MK) (42 prostheses); 3 - group consisted of 35 patients who underwent prosthetics using zirconium crowns (CC) (40 prostheses). A total of 206 prostheses were made. The concentration of iron, calcium, potassium, magnesium, sodium, chlorides and phosphates and the pH of the oral fluid were determined in the clinical diagnostic laboratory of the 1st clinic of SamGosMI, 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 a meal, 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 the oral fluid were measured on a semi-automatic biochemical analyzer "Mindray BA-8SA" (China) by the photocolormetric method using standard kits of the manufacturer's reagents. Statistical processing of the results of the study 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 their discussion During the general examination of patients, the presence of visually distinguishable foci of abrasion along occlusal contacts for all types of prostheses (Shk, MK and MK) was noted and amounted to 14.6%. 13.1% and 2.8% of cases, respectively. Crown perforation was noted in 8.8% of cases in patients with SC. In these patients, in 44.2% of the examined patients swelling and bleeding of the marginal gums were noted. In contrast to SM in patients with MC and CC, prosthetic structures did not cause pathological changes in the marginal gingiva in all periods of observation. When comparing the concentration of Na⁺, K⁺, Ca²⁺, Mg²⁺ in the oral fluid in patients of the control group with patients with up to

4 defects in hard tissues of the teeth, partial absence of up to 4 teeth before prosthetics, there are certain differences that allow us to judge the effect of quantity and localization of dental defects E quality indicators of mixed saliva. In patients with a defect in the hard tissues of the teeth before prosthetics, the concentration of Ca- in the mixed saliva did not depend on the amount of the 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 in 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 the mixed saliva was lower compared to the control group (1.65 ± 0.05 and 1.60 ± 0.03 mmol/l, respectively). The concentration of calcium and phosphates in mixed saliva in the examined patients of the control group of patients with defects in hard tissues of various numbers of teeth. The concentration of phosphates in the mixed saliva in patients with defects in the hard tissues of the teeth, before prosthetics, does not differ from the data of the control group. However, in 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 , compared with 3.47 ± 0.03 mmol/l). 0.35 0.35 0.33 0.35 0.25 0.2 0.15 0.05 1-2 zefect partial partial solid absence 1-2 absence 3-5 2. The concentration of magnesium ions (mmol/l) in the mixed saliva of the examined patients before prosthetics. In patients with a defect in hard tissues of teeth 1-2 and 3-5, the concentration of Mg- 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). The concentration of Na* and K* (mmol/l) in the mixed saliva of the examined patients before prosthetics - 0.04 and 16.2 ± 0.04 relative to 16.1 ± 0.07 mmol l). and in patients with partial absence of 1-2 and 3-4 frontal teeth, it is lower than in the control pear (16.05 ± 0.05 and 16.02 ± 0.03 mmol). The content of potassium in the oral fluid of patients with a defect in hard tissues 1-2 and 3-5 teeth before orthopedic treatment was higher when compared with the control group (18.3 ± 0.17 and 18.13 ± 0.15 vs. 17.97 ± 0.19 mmol/l). and in patients with partial absence of 1-2 and 3-4 teeth, it is lower than in the control group (17.7 ± 0.14 and 17.3 ± 0.13 mmol/l, respectively). When studying the dynamics of changes in the sodium content in patients of the control group, it was found that this indicator is 16.2 ± 0.1 mmol l (Fig. 4). For patients with SC, 15 days after prosthetics, its concentration is 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 is 17.5 ± 0.08 mmol/l, and by 12 and 24 months - 17.85 ± 0.06 and 17.87 ± 0.05 mmol/l. 20 18 16 14 12 10 4 p1 group 2 group h group.

Dynamics of changes in the sodium content in mixed saliva in those examined. In those examined with MK 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. b 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 concentration of Na "was 16.8 ± 0.11 mmol l. The concentration of K- in patients in the control group is 16.47 ± 0.1 mmol/l. For patients with SC through 0 5 months after prosthetics, the concentration of K- is 18.1 ± 0.03 mmol l, after 1 month this figure is 18.12 ± 0.02 mmol l, by 3 months after prosthetics 18.01 ± 0.04 mmol, by month 18, 16 ± 0.03 mmol / l, to 12 and 24 - 17.85 ± 0.04 and 18.02 ± 0.05 mmol L. By the end of the study, the concentration of K- was 17.9 ± 0.04 mmol / l For patients with MCMP prostheses, the concentration of K- 15 days after prosthetics was 18.4 ± 0.05 mmol/l, 1 month - 18.3 ± 0.04 mmol/l, 3 months - 18.3 ± 0.07 mmol/l, 6 months - 18.4 ± 0.05 mmol/l, by 12 and 24 months - 18.33 ± 0.06 and 18.31 ± 0.07 mmol/l, respectively. month 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. b 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. 19 18.5 18 17.5 17 16.5 16 and 1 group 2 group 3 group 5. Dynamics of changes in the content of potassium in the oral fluid. In the group of patients with CBMC prostheses after 0.5 months. It was equal to 17.9 ± 0.07 mmol, 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, to 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. 2.5 1.5 1 0.5 "1 group 2 group 3 group. Dynamics of Ca-* concentration in oral fluid In patients of the control group, the calcium content was 1.8 ± 0.07 mmol l (Fig. b). For patients with SC 15 days after prosthetics 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, 0.2 ± 0.02 mmol/l, by 12 and 24 months - 2.08 ± 0.02 and 2.09 ± 0.01 mmol l. In patients with MCMP prostheses after 15 days - 1.83 ± 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 ; B 1.85 ± 0.02 mmol/L, respectively 2.5 2 LLLLLLLL 15 1 0.5 in1 group 2 group 3 group.

Dynamics of changes in the magnesium content in mixed saliva in the examined patients. In patients with MK prostheses, the concentration of Mg-- 15 days after prosthetics was 0.36 ± 0.02 mmol/l, 1 month. - 0.36 ± 0.01 mmol/l, 3 months - 0.38 ± 0.02 mmol l, 6 months. - 0.39 ± 0.02 mmol/l, 12 and 36 months - 0.39 ± 0.01 mmol l and 0.4 ± 0.02 mmol/l, respectively. In the group of patients with CBMC prostheses, 0.5 months after prosthetics, the concentration of Mg-- was 0.35 ± 0.01 mmol / l, after 1 month 0.34 ± 0.02 mmol/l, by 3 months - 0.35 ± 0.01 mmol/l, kb month - 0.34 ± 0.02 mmol, by 12 and 24 - 0.35 ± 0.02 and 0.34 ± 0.01 mmol/l. 6.9 15 days 3 months 6 months 12 months 36 months 01 group 2 group ST group Fig. 8. Dynamics of the pH of the oral fluid. When studying the dynamics of patients 7.24 ± 0.03 (Fig. 8). In patients with SC after 0.5 months. 7.05 ± 0.03 , after 1 month. - 6.97 ± 0.01 , to the 3rd control group, it was found that in patients of this group, this indicator amounted to changes in the pH value in the month after prosthetics 6.95 ± 0.02 , by the 6th month 6.93 ± 0.02 , by 12 and 24 - 6.9 ± 0.01 and before prosthetics 1 month 24 months.

89±0.02 mmol/l. By the 36th month in the group of patients with SC it was 6.9±0.01 mmol/l.

For patients with MVMP prostheses, pH after 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 MVD prostheses was 7.07±0.02.

In patients with CC 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, by 12 and 24 - 7.41±0.02 and 7.4±0.01. By the end of the study, pH in the group of patients with CBMC prostheses was 7.39±0.02.

Thus, summarizing 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, starting from 12 months after prosthetics and until the end of the study, dentures have an insignificant effect.

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