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The Condition of Non-Removable Dentures and the Surrounding Gum in The Supporting Teeth and Implants in the Presence of Milled Metal and Metal-Free Frames in the Prostheses

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Annotation: In modern dentistry, there is a tendency to replace the technology of wax modeling and metal casting with the technology of milling metal frames of prostheses from factory blocks [1, 3, 6, 7]. In addition, metal-free prosthesis designs are being actively introduced, manufactured mainly using two technologies: pressing and CAD/CAM milling [2, 4, 5]. Comparative studies of the clinical effectiveness of these fixed prosthesis designs are relevant. The purpose of the study is to conduct a comparative analysis of the results of non–removable prosthetics using modern structural materials: metal ceramics on milled and cast chrome-cobalt frames, pressed ceramics, ceramics on zirconium oxide frames.

Keywords: Dentistry, Prosthetics, Crowns, Efficiency, Implants.

Materials and methods of the study A comparison of the condition of artificial crowns and gums around fixed prostheses made of materials: – Group I – metal–ceramic crowns (61) and bridge-shaped prostheses (42, including 119 crowns) on cast frames made of chrome-cobalt alloy - 22 people; – Group II – metal-ceramic crowns (30) and bridges (14, including 37 crowns) on milled frames made of chrome–cobalt alloy - 25 people; – Group III – ceramic crowns (69) made of pressed ceramics – 20 people; – group IV – ceramic crowns (65) and bridges (58, there are 169 crowns in them) on milled frameworks made of zirconium oxide – 34 people. In addition, groups Ia, IIa, IIIa, IVa were formed, which included patients with crowns on dental titanium implants: Ia – 19 people, 48 metal-ceramic crowns on a chrome-cobalt cast frame; IIa – 14 people, 26 metal-ceramic crowns on a chrome–cobalt milled frame; IIIa – 11 people, 27 ceramic crowns made of pressed ceramics; IVa - 22 people, 60 ceramic crowns on an oxide-zirconium milled frame. Criteria of the USHPS (Ryge) system were used to assess the condition of artificial crowns (Z. V. Razumnaya, 2012). Subjective feelings of patients, cementation, replacement of prostheses have been added to the criteria. Among the hygienic and periodontal indices used: the index of oral hygiene J. C. Green J. R. Vermillion (OHI-S); papillary-marginal-alveolar index (PMA) in the modification of Parma; gingivitis index (GI) H. Loe, J. Silness. The results of the study and their discussion According to the data of a three-year analysis of the state of artificial crowns and surrounding tissues in supporting teeth and implants, different indicators of the effectiveness of metal-ceramic and metal-free ceramic crowns were revealed. The number of complications averaged by the studied criteria in degree "C" testified to the advantages of ceramic crowns on zirconium oxide

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frames (3.6%) and metal-ceramic crowns on milled chrome-cobalt (3.8%) and crowns made of pressed ceramics (4.3%) when supported on teeth, metal-ceramic crowns on cast chrome-cobalt frames had significantly more complications (5.2%). There were no differences between the crowns in the degree of change of occlusal and approximal contacts and shape. Metal-ceramic crowns on cast frames had the worst indicators for marginal fit (10.0%), the condition of the marginal gum (7.2%), the development of secondary caries (3.9%), cementation (6.1%) and subjective manifestations of toxic-allergic phenomena (1.7%), and as a result, the number of replaced crowns for 3 years (5.6%). Complications during prosthetics with metal-ceramic crowns on milled chrome-cobalt frames according to the listed criteria were less frequent by an average of 20.9%. Ceramic crowns on zirconium oxide frames are close to metal ceramics on milled frames by all criteria, exceeding the quality of the latter in terms of edge fit, gum condition, subjective sensations and frequency of alterations When fixing crowns of different designs on implants, the patterns revealed during fixation on teeth in the ratio of complications in the condition of crowns and adjacent soft tissues are preserved. Crown chips are found on implants by 5.3% more often mainly due to violations of occlusive contacts, as well as subjective negative manifestations (by 46.7%). At the same time, the crowns on implants have a better edge fit (by 38.4%), approximal contacts (by 28.4%), the condition of the surrounding gum (by 47.9%), less frequent cementation of crowns (by 31.5%). In general, despite the more frequent replacement of crowns on implants (by 15.7% compared to teeth), the average rate of complications in crowns on implants is 21.2% lower.

Conclusion: Thus: – according to the clinical and functional examination, in the long term of operation, metal-ceramic crowns on cast chrome-cobalt frames are inferior in quality and condition of the gum to metal-free ceramic crowns and metal-ceramics on milled frames when supported by both teeth and implants.

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