



**AN IMPROVED METHOD OF MANUFACTURING A COMPLETE  
REMOVABLE PLATE PROSTHESIS UNDER THE CONDITION  
OF INTOLERANCE TO ACRYLIC PLASTIC IN PATIENTS**

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<b>ABSTRACT</b>	<b>KEYWORDS</b>
An original solution for the removal of completely missing teeth with intolerance to acrylic prostheses is presented. A reinforced full removable prosthesis made of polypropylene has been developed. Clinical trials have shown the advantages of the proposed method in comparison with the most common similar products.	full removable prosthesis, polypropylene, intolerance to acrylic resin.

**Introduction**

currently, there is a tendency to increase the number of patients who do not have teeth at all, which increases the level of functional and aesthetic requirements of patients to the quality of orthopedic care [1]. This is mainly due to an increase in the share of the elderly population in the general population in almost all countries of the world. Previously, removable prostheses were replaced exclusively with acrylic ones, but in the second half of the XX century, the interest of scientists dealing with the problem of improving prosthetic materials focused on thermoplastics. Thermoplastic polymers and copolymers (thermoplastics) have many advantages over traditional powdered and liquid polymer systems used in dental prosthetics [2]. Thermoplastic polymer materials have high resistance to twisting, high fatigue resistance (wear resistance), excellent resistance to dissolution and stable strength [3]. One of the most attractive qualities of thermoplastics is that they do not contain free monomers [4]. In addition, there are practically no voids in thermoplastics, which means that the probability of penetration of liquids and biological substances into them is less, which leads to less odor and color change, which favorably affects the performance characteristics of dentures. All these factors are important in the manufacture of temporary and permanent prostheses during implantation treatment, in complex reconstructive procedures and, ultimately, in the manufacture of permanent removable dentures of the oral cavity [5]. The main field of application of prostheses without acrylic plastics is partial prosthetics. When treating patients with complete secondary prostheses, a number of problems arise. Namely: a change in the elasticity of the prosthesis under the influence of intraoral temperatures, especially during chewing load, as well as a deterioration in the stability and fixation of the prosthesis in the upper jaw [6]. Therefore, we have set a goal to improve the quality of prosthetics with full prostheses and reduce the number of prosthetic complications - prosthetic stomatitis. Materials and methods To improve this method, we have proposed the following method of manufacturing removable complete prostheses [7]. After removing the functional impressions, the

model is cast in a plaster of the 3rd class with silicone material. The surface of the model is crimped with clasp wax and used as a spacer, and the frame is modeled with profile wax taking into account the tension lines of the plate prosthesis. The frame is cast from metal (Fig. 1 and 2). The frame is installed on the model, fixed to it with adhesive wax, covered with a plate of base wax and the packing of teeth begins. After testing the structure in the oral cavity, the basis of the final removable complete prosthesis is modeled, cast according to the principles of injection molding (Fig. 3) and fixed in plaster on a special cuvette (Fig. 4). After replacing the wax with polypropylene, the prosthesis is machined. Thus, a reinforced full removable prosthesis on a polypropylene plate (APPPP) is obtained, which does not have the disadvantages of an acrylic prosthesis and, thanks to the frame, does not have the disadvantages of a polypropylene base (Fig. 5). As a clinical trial of this prosthesis, 79 patients with a history of toxic-allergic prosthetic stomatitis and complete absence of teeth in one jaw underwent repeated prosthetics. Patients in good anatomical and functional condition were selected, and the results of the study were objective. The patients were divided into three groups according to the method of manufacturing a complete removable prosthesis: Group 1 - acrylic full removable prosthesis made of colorless plastic; Group 2 - a complete removable prosthesis with a metal base was made; group 3 - patients were restored according to the method developed by us. To assess the effectiveness of the prosthetics technique, changes in the pH of the oral fluid, the degree of leukocyte migration, the rate of detachment of the mucosal epithelium in the prosthesis area and capillary resistance were studied. This may be due to a certain "habituation" to the monomer of the mechanism of homeostatic stability and the formation of a chronic inflammatory focus during the first months after the installation of the prosthesis. In the remaining groups, pH deviations up to one month were insignificant, and more distant observations indicated a complete recovery. As for the degree of migration of leukemic cells in the oral cavity (Table. 2), then this indicator is one of the most useful for assessing the quality of prosthetics with removable prostheses, taking into account the effect of the prosthetic bed on hard and soft tissues. In the first group of patients (acrylic prostheses), the migration index of the adhesive plaster was initially high. However, after a month, its increase was 41.7% of the initial value, and the decrease after a year was less than 5.5%. Acrylic prostheses had a significantly more favorable effect on the mucous membrane of the subgingival basal cavity than acrylic prostheses. This indicates that the prostheses have a potentially harmful effect, stimulating inflammatory processes in the mucous membrane of the prosthetic fundus caused by chronic trauma in the first observation period and chronic inflammation after 6 months and 1 year of use. The results confirmed by the epithelial cell migration test are shown in Table 3. Capillary resistance was studied using an electronic vacuum device in the upper and lower jaw before the start of prosthetics and after fixation of the prosthesis after 1 week, 1 month and 1 year.. From the data presented in the table, it can be seen that the average value of capillary resistance before fixation of the prosthesis was 55 s. The index of inflammation of the oral mucosa after 7 days was  $31.20 \pm 0.76$  s in group 1,  $26.40 \pm 0.50$  s in group 2 and  $23.90 \pm 0.77$  s in group 3. As can be seen, the indicators of group 1 differed significantly, which may be due to chronic toxic-allergic and inflammatory processes occurring in the mucous membrane of patients with acrylic prostheses After 6 months and 1 year, the numerical indicators of resistance of the capillaries of the mucous membrane in group 3 leveled off, although there was a tendency to increase  $58.30 \pm 0.39$  and  $56.40 \pm 0.50$  with accordingly.

## Results

Numerical indicators of capillary resistance in the first group for the year showed the smallest downward trend:  $42.30 \pm 0.97$  ;  $(40.00 \pm 0.81$  s. accordingly, this indicates a deep violation of the vascular bed of the prosthetic bed. In the study of the capillary resistance of the second group, the values after a month and a year showed a tendency to increase, although they did not return to normal values:  $44.30 \pm 0.31$  ;  $53.00 \pm 1.35$  s. The results of this study indicate that the resistance of the capillaries of the mucous membrane with different removable prostheses is not the same. However, for all types of prostheses, mechanical trauma by the basis of the prosthesis led to a significant violation of the resistance of the vascular bed, which decreased from 51.0 to 62.1% of the initial indicator. Thus, acrylic prostheses cause a persistent violation of the strength of the vascular bed, while prostheses made using our advanced technology demonstrate optimal restoration of capillary strength to  $52.470 \pm 1.01$  seconds.

## Conclusion

The conducted clinical substantiation suggests a possible mechanism of pathogenesis of prosthetic stomatitis. Mechanical injury is more or less inherent in all types of prosthetics. However, the adaptation of oral tissues and orthodontic correction neutralize the primary injury due to the rigid basis of the prosthesis. However, removable dentures are the cause of chronic stomatitis, since they disrupt the submucosal capillary network of the prosthesis base and cause local nutritional disorders. Our study showed that the prostheses made according to the method developed by us preserve the vascular network of the oral mucosa as much as possible due to optimal elasticity and the absence of laminar edges, which reduces the number of cases of traumatic prosthetic stomatitis.

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