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## **Comparative assessment of periodontal tissue condition during prosthetics with different types of inserts for aesthetic crowns**

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### **Abstract**

The advantages of the restoration of chewing teeth with ceramic inlays and composite materials are determined by the favorable physical and mechanical properties of modern ceramics with zero water absorption, optimal coefficient of thermal expansion, low thermal conductivity, biological compatibility and chemical stability in the oral cavity.. It is ceramics that is considered the most chemically inert material, and even the components - wear products that appear during abrasion do not cause allergic or toxic reactions in the oral cavity or inflammation of the marginal gums.

The aim of the study was to assess the state of the periodontal tissues of teeth restored with different types of inlay core and, thus, to predict the development of pathological processes in the tissues surrounding the restored root.

The conducted clinical and laboratory studies showed the significant advantages of the method of manufacturing a hip insert made of ceramics developed by us. Thus, according to the results of a comparative study of the dynamics of the level of glycogen in the periodontal tissues of the roots of teeth restored under aesthetic crowns with the use of root tabs, it is obvious that the use of ceramic tabs during prosthetics with ceramic crowns does not cause inflammatory processes in the periodontal tissues, but after traumatic exposure by preparation

and preparation of the tooth before prosthetics, recover quite quickly to the level of the indicator at the healthy gingival margin.

**Key words: periodontium; ceramic crowns; dental prosthetics; inlay core**

Many authors prove the clinical effectiveness of the restoration of chewing teeth with ceramic inserts and composite materials and convincingly confirm the advantages of ceramics over composites and other restorations in terms of aesthetic and functional qualities [1, 2, 3].

These advantages are determined by the favorable physical and mechanical properties of modern ceramics with zero water absorption, optimal coefficient of thermal expansion, low thermal conductivity, biological compatibility and chemical stability in the oral cavity [4]. It is ceramics that is considered the most chemically inert material, and even the components - wear products that appear during abrasion do not cause allergic or toxic reactions in the oral cavity or inflammation of the marginal gums [5].

Ceramic dental materials, according to numerous authors, have significantly higher physical and mechanical characteristics in relation to tooth tissues [6].

**The aim** of the study was to assess the condition of the periodontal tissues of teeth restored with different types of inlay core and, thus, to predict the development of pathological processes in the tissues surrounding the restored root.

The results of the study of the specified sample are presented in the table.1.

Table 1 - The results of the Schiller-Pysarev test in patients with a destroyed crown part of a tooth and restored with different types of hip tabs, conv. units

Group	Terms after the beginning of prosthetics					
	To pros- thetics	On the day of fixation of the crown	By 1 month.	By 2 month	By 6 month	After 1 year
The first (control)	2,21 ± 0,02	2,34 ± 0,02	2,20 ± 0,03	2,24 ± 0,04	2,21 ± 0,02	2,28 ± 0,01
Second (KHS)	2,46 ± 0,01	2,40 ± 0,02	2,36 ± 0,01	2,33 ± 0,02	2,35 ± 0,04	2,38 ± 0,03
p	<0,01	<0,05	<0,05	<0,05	<0,05	<0,05
Third (ceramics)	2,33 ± 0,01	2,40 ± 0,02	2,28 ± 0,02	2,30 ± 0,05	2,25 ± 0,06	2,20 ± 0,04
p	<0,05	<0,05	<0,05	> 0,05	> 0,05	> 0,05
Fourth (our development)	2,30 ± 0,04	2,35 ± 0,01	2,20 ± 0,01	2,20 ± 0,02	2,18 ± 0,02	2,22 ± 0,05
p	<0,05	> 0,05	-	> 0,05	> 0,05	> 0,05

*Notes: p is the probability compared to the control group*

It is known that under the influence of chronic inflammation in the gingival tissue, the amount of glycogen, stained brown with iodine, increases sharply, which indicates a positive test. The dynamics of the sample allows us to judge the effectiveness of rational prosthetics and its effect on the tissues of the marginal area of the gums.

From the data presented in the table. 1 shows that the sample indicators in the control group are at a stable level during all periods of the study (on average 2.20 conv. units). However, after fixing the tab and in the process of manufacturing the covering structure, the indicator increases by 5.5% (to an indicator of  $2.34 \pm 0.02$  conv. units), and after long-term use of the structure, it returns to the original indicator (Fig. 1).

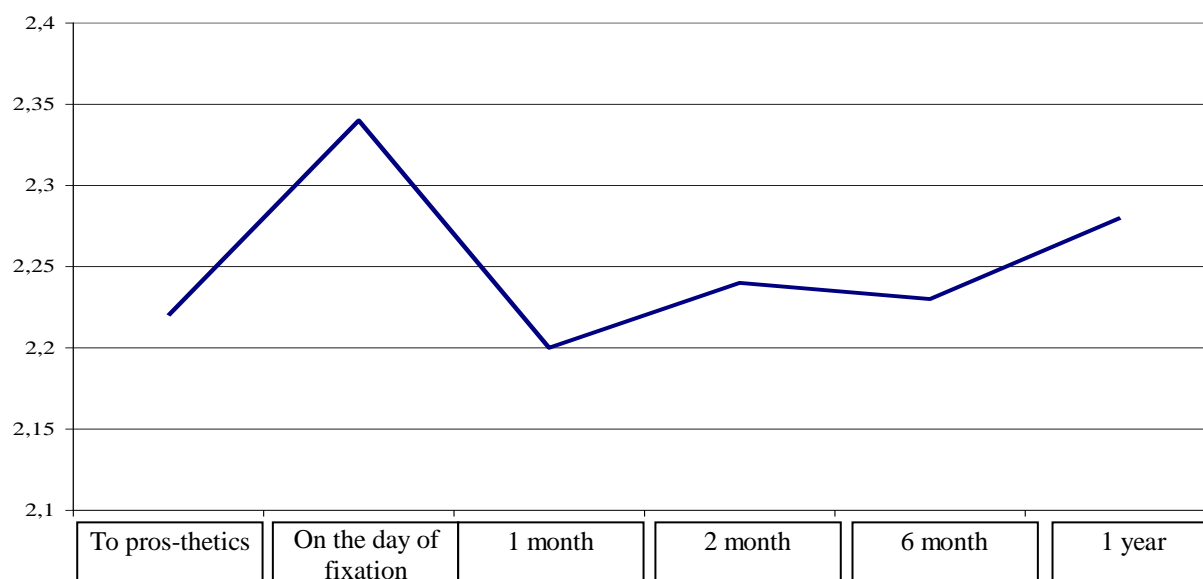


Fig. 1 - Dynamics of changes in the Schiller-Pysarev test index in the control group, conv. units

The indicators of this sample in patients after prosthetics are reduced to the norm, which is obviously related to the improvement of the condition of the periodontal tissues after full adaptation to the crown covering structures.

When analyzing the results of research in the second group (use of cobalt chrome inserts with a ceramic covering structure) first (before preparing the root for the hip insert), the indicator is  $(2.46 \pm 0.01)$  conv. units. In the process of prosthetics, the indicator slightly decreases (to the indicator  $(2.40 \pm 0.02)$  conv. units. and equalizes to the normal indicator only 1 year after prosthetics (Fig. 2).

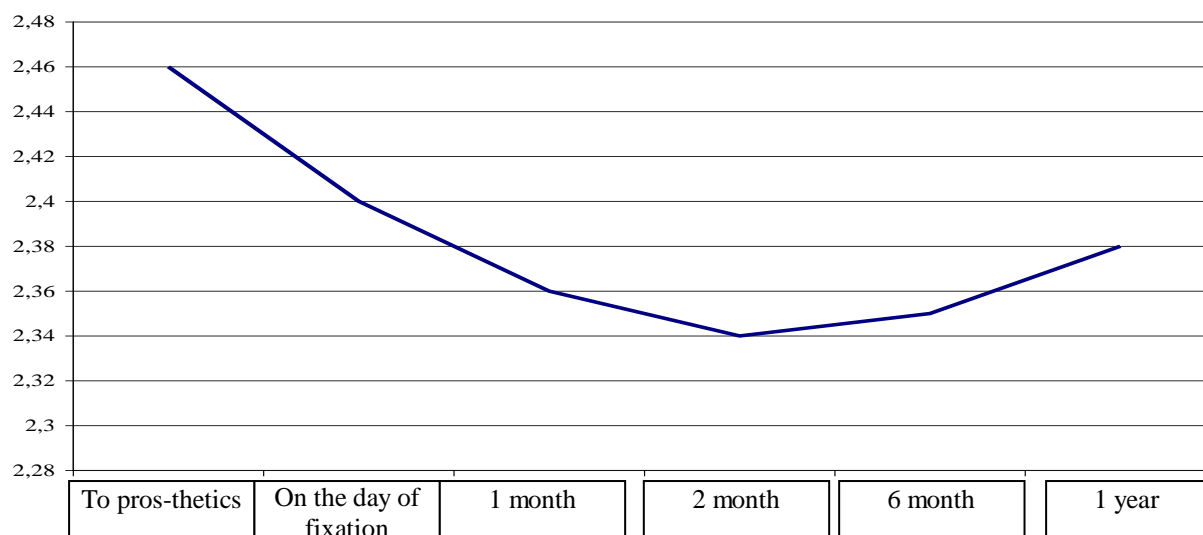


Fig. 2 - Dynamics of changes in the Schiller-Pysarev sample index in the second group of studies, conv. units

In the third group (use of traditional manufacturing methods), the fluctuations of the indicator were insignificant (Fig. 3), which indicates the bioinertness of the ceramic insert.

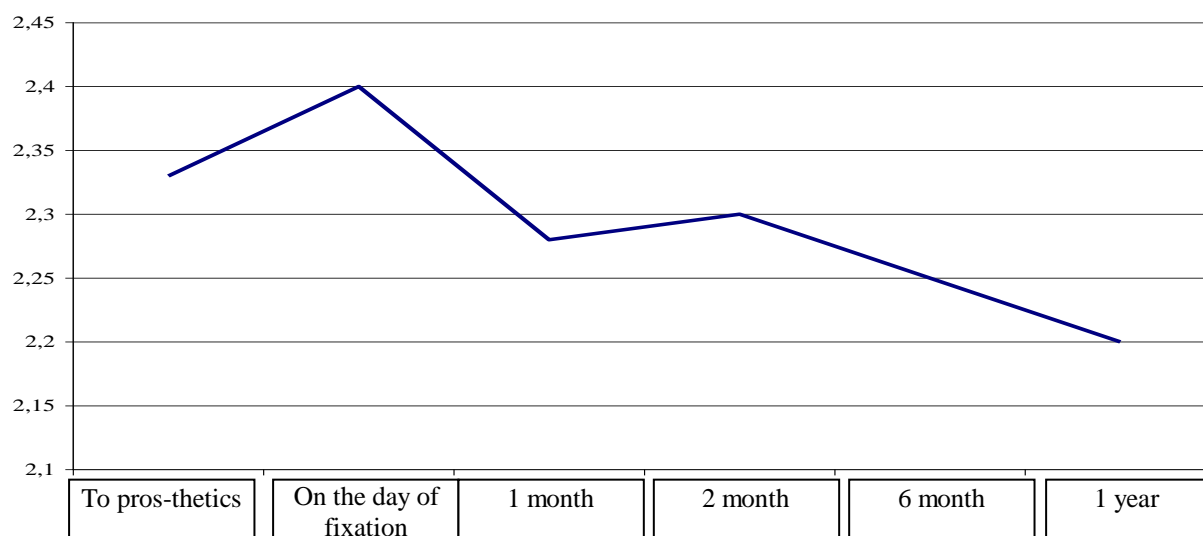


Fig. 3 - Dynamics of changes in the Schiller-Pysarev sample index in the third group of studies, conv. units

A slight increase in indicators during the clinical process of prosthetics, in our opinion, is explained by some traumatic prosthetics.

The fourth group (tabs manufactured using our technology) is characterized by an almost complete absence of fluctuations in the glycogen index (Fig. 4).

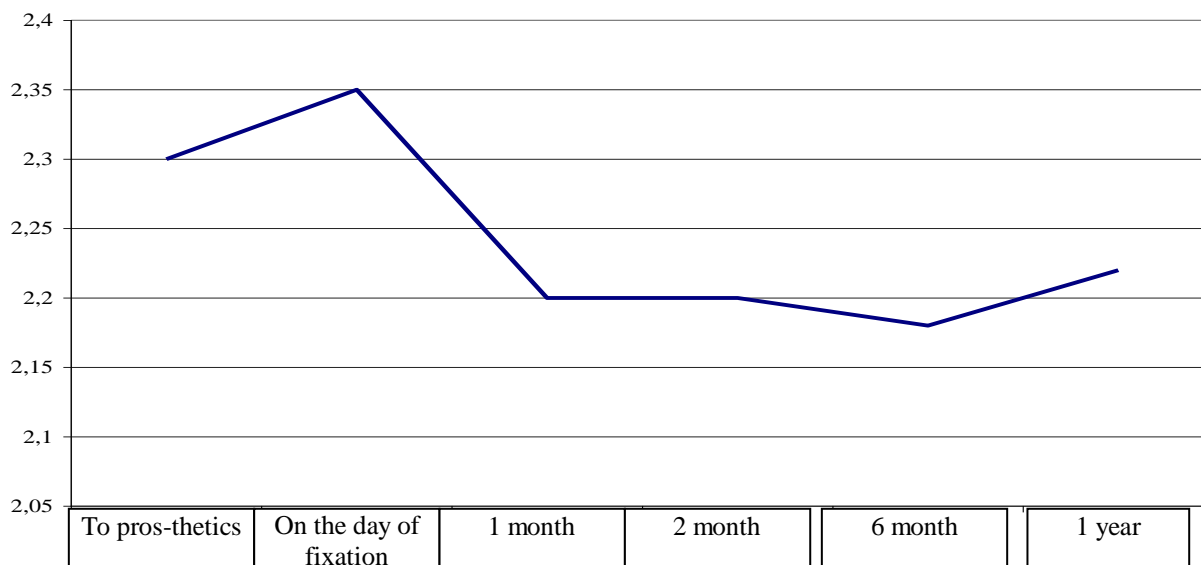


Fig. 4 - Dynamics of changes in the Schiller-Pysarev sample index in the fourth group of studies, conv. units

If at the beginning of the clinical studies the indicator was  $(2.30 \pm 0.04)$  human units, then after 1 month after prosthetics the indicator decreases to  $(2.20 \pm 0.01)$  human units. and kept at this level for 1 year.

So, according to the results of a comparative study of the dynamics of the glycogen level in the periodontal tissues of the roots of teeth that are restored under aesthetic crowns with the use of root tabs, it is obvious that the use of ceramic tabs during prosthetics with ceramic crowns does not cause inflammatory processes in the periodontal tissues, but after traumatic exposure by preparation and preparation of the tooth before prosthetics, it quickly recovers to the level of the indicator at the healthy gingival margin.

**Conclusions.** The conducted clinical and laboratory studies showed the significant advantages of the method of manufacturing a hip insert made of ceramics developed by us. Thus, according to the results of a comparative study of the dynamics of the level of glycogen in the periodontal tissues of the roots of teeth restored under aesthetic crowns with the use of root tabs, it is obvious that the use of ceramic tabs during prosthetics with ceramic crowns does not cause inflammatory processes in the periodontal tissues, but after traumatic exposure by preparation and preparation of the tooth before prosthetics, recover quite quickly to the level of the indicator at the healthy gingival margin.

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