

Comparative Evaluation Of The Efficiency Of Conducting Individual And Professional Hygiene In Prosthetics For Dental Implants

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Under our supervision, there were 92 patients with included and terminal defects of the dentition, who underwent prosthetics based on dental implants of the “DIO” system at the Department of Orthopedic Direction FPK TGSI

Control group (13) of the patient, “manual toothbrush” - during the entire study period, patients used only a manual toothbrush to clean the crowns on implants;

The second group (30) of patients who were prescribed a “manual toothbrush + interdental brush”, corresponding to the size of the proximal space of the orthopedic construction;

The third group (49) of patients who were prescribed a “manual toothbrush + interdental brush + irrigator”, in addition to a manual toothbrush, were prescribed an interdental brush and an oral irrigator, an irrigator Waterpik WP-660 (Aquarius) was prescribed for the oral cavity after brushing teeth twice per day for 3-5 minutes, the power of the water jet of the irrigator corresponded to mode 2.

An index assessment of the amount of plaque in the area of a fixed structure on implants was carried out using a simplified index of oral hygiene (IGR-U) (J. R. Vermillion, 1964)

The condition of the gums in the area of dental implants was assessed based on the Gingival Index (GI) - Loe & Silness, 1963.

Thus, at the beginning of the study in all three groups, the HI was low and corresponded to good implant hygiene. After 3 and 6 months, the values of those indices were significantly worse, and corresponded to the unsatisfactory hygiene of the implants. In groups 2 and 3, throughout the entire study, HI indices were optimal and corresponded to good and satisfactory implant hygiene. The indicators of the 3rd group, in which the whole complex of individual and professional methods was applied, were the most positive throughout the study, in comparison with other groups.

Analysis of the results of the Gingival Index study showed that the indicator increased in all observation groups.

In group 2 patients using manual dental and interdental brushes for cleaning the structure, by the end of the study period the index value increased to 0.95 ± 0.05 points, which corresponded to mild gingivitis of the gums in the area of implants, i.e. there was slight hyperemia and individual punctate bleeding of the gums at the probing sites. Patients of the 3rd group, using an irrigator, had minimal index values at all periods of the study, and the index values were interpreted as “normal gums”, that is, no signs of gingivitis were recorded.

Key words: *implants, HI, ISP (the index of suprastructure plaque), ISC (the index of supraconstruction calculus), irrigator, brush, gums, hyperemia.*

1. Introduction

Dental implantation continues to be one of the most important areas among the priority problems of dentistry in the modern world. The use of dental implants solves a significant part of the problems in the case of partial and complete absence of teeth, plays a decisive role in restoring the chewing function, helps in correcting and improving the aesthetics of the dentition, smile and face as a whole [1,3,4,5,15].

Implants are in constant contact with various fluids in the oral cavity (oral, gingival), food. In addition, the orthopedic construction on implants is a substance of accumulation of microbial plaque, which, in turn, can be the source of the development of an inflammatory reaction in the tissue surrounding the implant [6,9,14,16,17].

However, the lack of high-quality individual and professional oral hygiene leads to inflammatory changes in the peri-implant tissues, such as peri-implantitis and mucositis, and sometimes to the disintegration of the implant itself [1,2,7,11,12].

Therefore, high-quality, professional hygiene and the use of modern personal hygiene products for the care of the oral cavity in general and for the orthopedic structure on implants in particular is an important component of the success and longevity of this type of dental treatment.

The objective of the study: assessment of the hygienic status of the oral cavity depending on the methods used.

Material and research methods.

Under our supervision, there were 92 patients with included and terminal defects of the dentition, who underwent prosthetics based on dental implants of the “DIO” system at the department of orthopedic direction of the FPC TGSI. This system has an implant-abutment connection in the form of a hex connection using a fixing screw.

The patients were divided into two groups by the method of fixed simple randomization using a table of random numbers, depending on the prescribed treatment and prophylactic complex. All groups were matched for gender and age.

The study was carried out 1, 3, 6 months after fixation of the orthopedic structure. Oral consent was obtained from patients for the study.

Control group (13) of the patient, “manual toothbrush” - during the entire study period, patients used only a manual toothbrush to clean the crowns on implants;

The second group (30) of patients who were prescribed a “manual toothbrush + interdental brush”, corresponding to the size of the proximal space of the orthopedic construction;

The third group (49) of patients who were prescribed a “manual toothbrush + interdental brush + irrigator”, in addition to a manual toothbrush, were prescribed an interdental brush and an oral irrigator, an irrigator Waterpik WP-660 (Aquarius) was prescribed for the oral cavity after brushing teeth twice per day for 3-5 minutes, the power of the water jet of the irrigator corresponded to mode 2.

All patients were trained in the method of teeth cleaning according to G.N. Pakhomova. In order to achieve comparable results, patients used the same Colgate Total toothpaste (Colgate-Palmolive) and a medium hardness prophylactic toothbrush Colgate 360 soft massager. All patients underwent regular professional hygiene every 3 months, after fixation of the structure according to the protocol for managing patients with dental implants.

The index assessment of the amount of plaque in the area of the fixed structure on the implants was carried out using the simplified index of oral hygiene (IGR-U) (J. R. Vermillion, 1964).

Simplified Oral Hygiene Index (OHI-S) proposed by GreenJ.C., VermillionJ.R. (1964) is a double index. The hygiene index of the supraconstruction supported on dental implants was calculated by the formula: HI = ISP + ISC, where IPS is the index of suprastructure plaque; ISC – the index of supraconstruction calculus.

The interpretation of the values of the hygiene index is given in table 1.

Table 1
Interpretation of hygiene index values

Hygiene index values	Hygiene Index Assessment	Oral hygiene assessment
0-0,6	Low	Good
0,7-1,6	Middle	Satisfactory
1,7-2,5	High	Unsatisfactory
>2,6	Very high	Bad

The index assessment of deposits was carried out visually on a 4-point scale in accordance with the criteria: 0 points - no soft plaque; 1 point - intermittent approximal deposits of soft plaque on the neck of the artificial crown of the prosthesis; 2 points - soft plaque deposits covering the neck of the artificial crown of the prosthesis circularly; 3 points - deposits of soft plaque covering the artificial neck on 1/3 of the surface of the crown of the prosthesis. Plaque index was assessed on all artificial crowns supported by dental implants and calculated by the formula:

$$ISP (ISC) = \frac{\Sigma \text{ points}}{n},$$

where Σ points is the sum of points according to the evaluation criteria; n is the number of implant-supported crowns examined. The values of the soft dental plaque index of the implants and the hard plaque index obtained separately were summed up, and the implant hygiene index was calculated. The interpretation of the index was carried out according to the following criteria: the IGS value from 0 to 0.6 corresponds to a low score; the HI value from 0.7 to 1.6 corresponds to the average HI score; HI value from 1.7 to 2.5 corresponds to a high score; HI value > 2.5 corresponds to a very high estimate.

The condition of the gums in the area of dental implants was assessed on the basis of the Gingival Index (GI) - Loe & Silness, 1963. To determine the index, the gums were palpated with a blunt instrument and the implant-gingival sulcus was carefully probed with a plastic probe. The assessment of the condition of the gums was carried out on a 4-point scale at 4 points of the implant in accordance with the criteria: 0 points - normal gums, no inflammation, no hyperemia; 1 point - slight inflammation of the gums - slight hyperemia, slight edema, no bleeding; 2 points - average inflammation - hyperemia, edema, bleeding on probing or palpation; 3 points - severe inflammation - severe hyperemia, edema, a tendency to spontaneous bleeding.

The gingiva was examined in the area of all implant-supported crowns. The sum of the scores near each implant was added up, divided into four (according to the number of evaluated sites), and the index value of this implant was derived. After summing up all the GI values and dividing by the number of implants, the average gingival GI value for this patient was obtained according to the formula:

GI teeth = \sum points
 4

Интерпретация:
 0,1–1,0 — mild gingivitis;
 1,1–2,0 — moderate gingivitis;
 2,1–3,0 — severe gingivitis.

The GI individual = GI teeth
 assessment were n teeth obtained results of the index processed in accordance with the principles of medical statistics using the software package “Excel-7”, “Statistica 5.0” using nonparametric methods for analyzing quantitative characteristics.

2. Research results and their discussion

The data from the studies showed that in all three groups, regardless of the set of personal hygiene products, 1 month after fixation of the orthopedic structure, the hygiene index score was low, which showed good hygiene in the area of implants (Table 2).

At 3 and 6 months of the study, different amounts of plaque were observed in all three observation groups. In the control group, 3 and 6 months after the fixation of the orthopedic structure, IGSCs 1.2 and 1.7 were fixed, which corresponded to the average hygiene index and satisfactory hygiene of the implants. At the same time, in patients of groups 2 and 3, the indicator after 3 and 6 months was 0.8 and 1.6, and in the group where the entire set of personal hygiene products was used, the values of the hygiene index were 0.6 and 1.0, which corresponded to low assessments of hygiene and good hygiene of implants (table 2).

As can be seen from the data provided in Table 2, the hygiene in the area of implants was also different depending on the personal hygiene products used.

Table 2
Hygiene index indicators in patients, depending on the hygiene methods used

Hygiene Index Values, Hygiene Index Assessment, HI			
Group	Timing		
	1 month	3 months	6 months
Control	0.7 / low / good	1.2 / average / fair	1.7 / high / unsatisfactory
2 group	0.6 / low / good	0.8 / average / fair	1.6 / average / fair
3group	0.6 / low / good	0.6 / low / good	1.0 / average / fair

Thus, at the beginning of the study in all three groups, the HI was low and corresponded to good implant hygiene. After 3 and 6 months, the values of those indices were significantly worse, and corresponded to the unsatisfactory hygiene of the implants. In groups 2 and 3, throughout the entire study, HI indices were optimal and corresponded to good and satisfactory implant hygiene. The indicators of the 3rd group, in which the whole complex of individual and professional methods was applied, were the most positive throughout the study, in comparison with other groups.

Analysis of the results of the Gingival Index study showed that the indicator increased in all observation groups.

In patients of the 2nd group who use a manual dental and interdental brush to clean the structure, by the end

During the study period, the index value increased to 0.95 ± 0.05 points, which corresponded to mild gingivitis of the gums in the area of implants, i.e., there was slight hyperemia and individual punctate bleeding of the gums at the probing sites. Patients of the 3rd group, using an irrigator, had minimal index values at all periods of the study, and the index values were interpreted as “normal gums”, that is, no signs of gingivitis were recorded. In patients of the 3rd group, after 6 months of functioning of the implants, the GI value did not exceed 0.08 points, which was 92% lower than in the patients of the control group. In the control group, the GI values in patients at the beginning of the study were insignificant, but by the end of the study they reached 1.7 ± 0.05 points, which corresponded to moderate gingivitis and was accompanied by mild hyperemia and pinpoint bleeding of the gums in the area of implants. At the beginning of the study, patients of the 2nd group also did not show any signs of gingival inflammation in the area of implants, however, after 3 and 6 months, the values of the gingival index in the area of implants were 0.57 ± 0.05 and 1.2 ± 0.05 points respectively. In general, in patients of the control and 2 st groups, despite regular professional hygiene in the area of implants, there was a slight deterioration in the condition of the gums, corresponding to gingivitis of moderate severity. Patients of the 3rd group showed a better condition of the gums in the area of implants. In group 3, after 6 months, the state of the gums, according to the interpretation of the gingival index, was defined as “no inflammation” and significantly differed from the control group - by 92%.

3. Conclusion

The performed index assessment allowed us to establish the relationship between the level of dental hygiene and the hygienic state of the structure on the implants. The index score for the implant area shows the absence of severe gingival inflammation and significant plaque accumulation in the area of the implants in the first months of their operation. This is due to the fact that it is, firstly, regularly conducted professional hygiene in the field of implants and teeth, and secondly, individual hygiene measures carried out by the patient himself. The inclusion of an oral irrigator in the home implant care kit has been particularly effective. The use of an interdental brush has proven less effective in patients with an implant-supported design. As shown by the data of the conducted index assessment, cleaning the structure with a manual toothbrush alone does not provide sufficient implant hygiene. The use of an irrigator in addition to the complex “manual dental + interdental brush” significantly improves the quality of personal hygiene and ensures healthy gums and positive HI indicators in the area of implants.

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