

EVALUATION OF PATIENT'S SATISFACTION WITH FIXED-PROSTHODONTICS THERAPY

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ABSTRACT

The purpose of the study was to evaluate fixed prosthodontics therapy by dental bridges according to the opinion of the patient using a questionnaire.

Materials and Methods: Sixty-five patients at the Department of Prosthodontics with Implantology completed the questionnaire consisting of two parts. The first part was composed of general information about the subject, and in the second part of the questionnaire each participant evaluated the success of the therapy in terms of aesthetics, phonation, masticatory function, condition of surrounding gingiva and general impression. Those parameters the examinees rated with scores from 1 to 5.

Results: Most of the patients were satisfied with their fixed-prosthodontics constructions, and distribution of the resulting variables was asymmetrical to the highest values. Younger patients were more satisfied than the older. Men showed a greater satisfaction with the general impression and the aesthetics than the women ($p < 0.005$). In the assessment of satisfaction among patients with different levels of education no difference was found. The correlation between fixed prosthesis length of wearing and the satisfaction with the aesthetic, the significance was borderline, i.e., there was a tendency that the longer patient wears it the satisfaction with aesthetics collapses.

Conclusion: Patients who had metal-ceramic bridges showed greater satisfaction with the condition of the gingiva and fixed prosthetic appliance in general in comparison with the patients who had resin veneers bridges.

Keywords: Patient satisfaction, dental bridge, a questionnaire.

Introduction

Loss of teeth as a first indicator of early aging causes emotional trauma to many people. Although removable prosthesis can achieve remarkably natural effects, hygienic and good conditions of maintenance, patients are often burdened with a sense of disability, early aging and limited functional abilities, both in terms of mastication and in terms of reduction of oral space. The process of adaptation to the prosthetic restoration is significantly reduced by making dental bridge; it preserves the taste and the touch of the food as well as phonation, because the prosthetic restorations are largely limited to the area of natural teeth [1]. Therefore we can say that in addition to aesthetic, functional rehabilitation and prophylactic rehabilitation of orofacial system, dental bridge contributes to the psychological adaptation of the patient. Dental bridge is physiologically optimal prosthodontics appliance as masticatory force is transferred via the remaining teeth in the bone fundament so that the masticatory effect is almost equal as masticatory effect of natural teeth [1].

The number of the patients who cannot integrate with "legeartis" made bridges is very small, because fixed prosthodontics constructions with abutment teeth and their supporting tissues constitute functional complex which allows patients performing all of the functions without major restrictions.

Persistence of the fixed prosthodontics appliances is based on a proper assessment of the load and the proper selection and processing of building material, and well-planned prosthetic therapy [2].

After some period it is inevitable that there might be changes in both, the organism and the prosthetic construction. Caries with possible complications, changes in the marginal gingiva, formation of gingivitis and periodontal pockets to extensive bone loss are the most common changes that occur on the abutment teeth [3].

The most common changes that occur in the prosthetic appliance and in the same time lead to compromising its aesthetics and function are given marginal sealing, loss of retention, chipping fracture of ceramics from metal ceramic bridges, separation, cracking or change in color of resin veneer bridges [4-7].

Analogous with the changes on living tissue and prosthetic appliance the patient's satisfaction has been changed with the existing prosthetic construc-

tion. Evaluation of the treatment by the dentist is often not in line with the patient's expectations and satisfaction including the function, aesthetics and psychosocial adaptation. Satisfaction is an important element in the evaluation of the treatment itself. In the literature there are a number of studies on the patient's satisfaction with partial and total removable dentures while research on patient satisfaction success with fixed-prosthodontics therapy is rare [8-13].

The purpose of the study was to evaluate fixed-prosthetic therapy by bridges based on the opinion of the patient and also to determine the influence of gender, age, education level, length of wearing and the types of materials with the satisfaction of the patient with fixed prosthodontics therapy.

Patients and methods

The study included total of 65 patients examined at the Department of Prosthodontics with Dental Implantology at the Faculty of Dentistry in Sarajevo. We examined 20 male and 45 female patients. The examinees aged from 23 to 67 years. Each subject filled out a questionnaire created for the purpose of research consisted of two parts. The first part consisted of general information about the subject: age, sex, education, sequence number and length carrying fixed prosthetics, the presence of bad habits, chronic diseases, medication and regularity and method of oral hygiene.

In the second part of the questionnaire, each examinee assessed the performance of fixed prosthodontics appliance therapy with a different point of view: a general score, aesthetics score, phonation score and the score regarding condition of surrounding gingiva of the dental bridge.

The examinees scored those parameters from 1 to 5 where:

- 1 - deficient;
- 2 - sufficient;
- 3 - good;
- 4 - very good;
- 5 - excellent.

Prosthodontics specialists determined the material of which the bridge was made. Out of the total 65 patients, 53 were with metal-ceramic bridges and 12

patients with resin veneer bridges. The obtained data used the Statistical Package SPSS 15.0 (Statistical Package for Social Science). Descriptive statistics, Skewness test distribution normality, Spearman's correlation coefficient and Mann-Whitney U test for the significance of differences between variables were performed.

Results and discussion

Normality of distribution for all variables was tested by the Skewness-test, where it is proven that the resulting distribution is asymmetric to the highest values (examinees evaluated tested values with the highest scores) which indicates that the majority of patients were satisfied with their fixed prosthodontics appliance. The results correspond to the results of the Stipetić and authors who tested the satisfaction of fixed prosthetic appliance at the Faculty of Dentistry in Zagreb [14].

Studies investigating patient's satisfaction with fixed prosthodontics appliance, whether abutments were natural teeth or dental implants, were valued with very high scores of patient's satisfaction [15-20].

The relationship between people of different ages and satisfaction with fixed-prosthetic appliance, satisfaction with the aesthetics, phonation, masticatory function and satisfaction with the condition of the gingiva is tested with the Spearman's rank correlation coefficient. Statistically significant difference in the level of significance ($p < 0,05$) in the assessment of the pleasures with fixed prosthodontics appliance was found at patients of different ages and shown in **Table 1**. Younger patients were more satisfied than older ones ($p < 0,05$).

In research of Vallitudo and authors, the appearance of teeth was more important to the examinees of younger age [21] so we can say that in our research more satisfaction with fixed prosthetic appliance in younger subjects derives from their greater need for the replacement of deteriorated aesthetics incurred by the tooth loss, as well as other functions of the stomatognathic system. On the other hand, the viewer's perception and a visual experience could be seen as pleasant and beautiful in one individual and culture, while it could be seen nasty in another [22]. Thus, it is not surprising that our results contradict the results of Stipetić and authors according to whom there was no statistically significant differences [23] between the patients of different age.

Significant difference between the assessment of the patient's satisfaction with fixed-prosthetic appliance, aesthetic satisfaction, phonation, masticatory function and satisfaction with the condition of the marginal gingiva between men and women was tested by Mann-Whitney U test and shown in **Table 2**. Statistically significant difference in the level of significance ($p < 0,05$) in the assessment of the pleasures with fixed prosthodontics appliance between males and females was demonstrated with the general satisfaction of prosthetic appliance ($Z = 2.045$, $p < 0,05$) and rating of aesthetics ($Z = 2.129$, $p < 0,05$). Men showed greater satisfaction with these variables than women. Significant difference for other variables between males and females was not found.

Nowadays, more attention is paid to the aesthetic appearance of the individuals. Color, shape, size and position of the teeth including displaying of their harmony with the other orofacial structures, and even patient characteristics affect the overall appearance of the individual. These factors are affected by individual preferences, cultural factors and sociodemographic factors and are changing over time [22].

	Satisfaction of fixed prosthodontics appliance	Satisfaction of aesthetic	Satisfaction of phonation	Satisfaction of masticatory function	Satisfaction of condition surrounding gingiva
Age	-0,28	-0,15	-0,10	0,02	-0,12
Significance	0,02	0,24	0,45	0,89	0,36
Number of participant	65	65	65	65	65

Table 1. Significance between people of different ages in the assessment of different parameters related to fixed prosthodontics appliance on the base of patient's satisfaction

	Satisfaction of fixed prosthodontics appliance	Satisfaction of aesthetic	Satisfaction of phonation	Satisfaction of masticatory function	Satisfaction of condition surrounding gingiva
Mann-Whitney U	325,5	315	422	444,5	358,5
Wilcoxon W	1360,5	1350	1457	1479,5	1393,5
Z	-2,045	-2,129	-0,53	-0,097	-1,39
Asymp. Sig. (2-tailed)	0,041	0,033	0,596	0,923	0,165

Table 2. Significance between males and females in the assessment of different parameters related to fixed prosthodontics appliance on the base of patient's satisfaction

Females are reported to be more sensitive than males regarding the appearance of teeth, and they are more critical in judging their dental appearance [24], so it is not surprising that women were less satisfied with the aesthetic appearance of fixed prosthesis. Furthermore, woman evaluated their dental appearance using different esthetic parameters. [25]. These results correspond with the results of previous studies where women have more strictly scored the aesthetics orofacial complex than men [15, 26].

Significant difference between the assessment of the patient's satisfaction with fixed-prosthetic appliance, aesthetics satisfaction, phonation, masticatory function and satisfaction with condition of the gingiva among patients with different educational level was tested by Mann-Whitney U test. Significant difference in the assessment of the pleasures with fixed prosthodontics appliance between patients with different levels of education could not be found. The results correspond to the results of Akkarlsan and authors where educational level did not lead to changes in dissatisfaction and in general appearance but led to the change in satisfaction with tooth color in their study.

The relationship between length of wearing fixed prosthodontics appliance and satisfaction with fixed-prosthetic appliance, satisfaction with the aesthetics, phonation, masticatory function and satisfaction with the condition of the gingiva is tested with the Spearman's rank correlation coefficient and shown in **Table 3**.

The correlation between the length of the wearing fixed prosthesis and aesthetic satisfaction was of the border line significance, but we can say that there is a tendency showing that the length of wearing declines the satisfaction with aesthetics. It is inevitable that over time there is a change specifically on the abutment teeth such as secondary caries, which can lead to a loss of vitality of the abutment teeth and tooth fracture. The most common changes that occur in the periodontal tissues (gingival recession, gingivitis, periodontal pockets, and alveolar bone resorption with consequent extension of the clinical crown of the tooth) in addition to health problems significantly impair the aesthetics of fixed prosthetic appliance and can be increased by the length of wearing prosthodontics appliance [27, 28].

	Satisfaction of fixed prosthodontics appliance	Satisfaction of aesthetic	Satisfaction of phonation	Satisfaction of masticatory function	Satisfaction of condition surrounding gingiva
Length of wearing appliance	-0,10	-0,24	0,04	0,00	-0,21
Significance	0,41	0,05	0,78	1,00	0,09
Number of participant	65	65	65	65	65

Table 3. Significance between lengths of wearing fixed prosthodontics appliance in the assessment of different parameters related to fixed prosthodontics appliance on the base of patient's satisfaction

Changes on the prosthetic construction such as chipping of the veneer ceramic, discoloration, and cracked or detached resin veneer, loss of retention and de-cementation of crown may occur during the first years of wearing prosthodontics appliance [29]. Chipping of the veneer ceramic was the most frequently seen event that led to short-term (less than 3 years) failure and complications [4]. Over time, changes in the abutment teeth as the prosthetic construction require the replacement of existing fixed-prosthetic appliance with the new one, which is necessary to be explained to the patient. Patients often assume that the permanent crown or fixed prosthesis is permanent. They expect that nothing is to be done to maintain this condition. It is duty of the dentist to inform their patients that future care is necessary to maintain the restoration and the remaining teeth [15, 30].

Significant difference between the assessment of the patient's satisfaction of fixed prosthodontics appliance, aesthetics satisfaction, phonation, masticatory function and satisfaction with the condition of the surrounding gingiva between patients with bridges made from two different materials was tested by Mann-Whitney U test and shown in **Table 4**.

Statistically significant difference ($p < 0.05$) in the assessment of the pleasure of fixed prosthodontics appliance between patients with bridges made from two different materials demonstrated general satisfaction of fixed prosthodontics appliance ($p < 0.05$) and satisfaction with condition of the surrounding gingiva ($p < 0.05$). Metal ceramic restorations show more advantages over resin veneer (metal polymer) such as better biocompatibility, less plaque adhesiveness, better reproduction, color stability and translucency. The possibility of complete reproduction of

the shape, surface structure and of color provides good aesthetic results unchangeable for a longer period in relation to the resin veneer restoration as it resulted with better general satisfaction in our research [31-34].

On the other hand, polymer materials have a poor ability of polishing and porosity and low abrasion resistance which will result in surface roughness which promotes the precipitation of microbial plaque with subsequent inflammation of the surrounding tissue [7, 35].

Creating optimal hygienic conditions is also deteriorated by bacterial contamination marginal gap at the coupling surfaces of metals and polymers due to lack of chemical bonds. The micro-crack, which comes from polymer veneer and metal, is inhabited by the microorganisms that determine discoloration of the polymer veneer and after a short period may be aesthetically discredited. The appearance of micro-cracks is a big problem in the technique of polymer veneers, because it essentially shortens the life of a prosthetic appliance, because cracking or falling off the facets compromises the aesthetics and function [7, 36, 37].

Patients who had metal-ceramic bridges assessed the condition of the gingiva better than patients who had resin veneers bridges. This is not surprising fact since the previous studies showed that dental porcelain is less susceptible to accumulation of bacterial plaque in comparison to resin and even to hard tooth structures [38-40].

The majority of periodontologists agree that the primary etiological factor of periodontal disease is dental plaque. Adherence of the plaque varies depending on the physicochemical properties, surface roughness, surface integrity of the dental materials,

	Satisfaction of fixed prosthodontics appliance	Satisfaction of aesthetic	Satisfaction of phonation	Satisfaction of masticatory function	Satisfaction of condition surrounding gingiva
Mann-Whitney U	214,5	220,0	243,0	266,5	188,5
Wilcoxon W	292,5	298,0	321,0	344,5	266,5
Z	-2,02	-1,84	-1,69	-1,08	-2,34
Asymp. Sig. (2-tailed)	0,043	0,066	0,091	0,281	0,019

Table 4. Significance between the patients with bridges made from two different materials in the assessment of different parameters related to fixed prosthodontics appliance on the base of patient's satisfaction

as well as finishing and polishing procedures which may result in differences in the surface roughness of dental materials, thus possibly affecting the formation and adhesion of bacterial plaques [41-43].

Conclusion

Results of this research showed that the treatment of dental bridge meets the patient's needs in case of partial loss of teeth. Most of the patients were very satisfied with aesthetic and functional aspects of the existing fixed prostheses. Data on patient satisfaction is an important source of information that can guide dentists to provide prosthodontics treatment that will fulfill patient's expectations.

Identifying the perception of the patient and his satisfaction with the existing aesthetics and function and desired treatment for the improvement of these parameters can be a guide for future strategy in planning and preparation of a prosthetic appliance.

References

1. Suvin M, Kosovel Z. Fix prosthetics. 4. Extended issue. Zagreb: Školska knjiga; 1990
2. Trifunović MD, Radlović S, Kandić MJ et al. Stomatology prosthetics - predklinika. 3th ed. Beograd: Institute for text books and teaching means; 2001
3. KcBasnyat S, Sapkota B, Shrestha S. Oral Hygiene and Gingival Health in Patients with Fixed Prosthodontic Appliances - A Six Month Follow-up. Kathmandu Univ Med. 2015; 13(52): 328-32.
4. Shi JY, Li X, Ni J, Zhu ZY. Clinical Evaluation and Patient Satisfaction of Single Zirconia Based and High-Noble Alloy Porcelain-Fused-to-Metal Crowns in the Esthetic Area: A Retrospective Cohort Study. J Prosthodont. 2016; 25(7): 526-30.
5. Behr M, Zeman F, Baitinger T, Galler J, Koller M, Handel G, et al. The clinical performance of porcelain-fused-to-metal precious alloy single crowns: chipping, recurrent caries, periodontitis, and loss of retention. Int J Prosthodont. 2014; 27(2): 153-60.
6. Anusavice KJ. Standardizing Failure, Success, and Survival Decisions in Clinical Studies of Ceramic and Metal-Ceramic Fixed Dental Prostheses. Dent Mater. 2012; 28(1): 102-11.
7. Jerolimov V, ed. Basis of stomatology materials. Zagreb: Faculty of Dentistry University in Zagreb; 2005, Available from: <http://www.sfzg.hr/>.
8. Kamber-Česir A, Džonlagić A, Ajanović M, Delalić A. Assessment of Patient's Satisfaction with the Partial Removable Denture Therapy. Pesq Bras Odontoped Clin Integr João Pessoa. 2011; 11(2): 171-5.
9. Knezović-Zlatarić, Čelebić A. A comparison of patient's satisfaction between complete and partial removable denture wearers. J Dent. 2003; 31(7): 445-51.
10. Akeel RF. Effect of the quality of removable prostheses on patient satisfaction. J Contemp Dent Pract. 2009; 38(8): 604-14.
11. Knezović-Zlatarić D, Čelebić A. Factors related to patients' general satisfaction with removable partial dentures: a stepwise multiple regression analysis. Int J Prosthodont. 2008; 21(1): 86-8.
12. Cosme DC, Baldisserotto SM, Fernandes EL, Elken Gomes Rivaldo EG, Rosing CK, Shinkai RS. Functional evaluation of oral rehabilitation with removable partial dentures after five years. J Appl Oral Sci. 2006; 14(2): 111-6.
13. DE Siqueira GP, Dos Santos MBF, Dos Santos JFF, Marchini L. Patients' expectation and satisfaction with removable dental prosthesis therapy and correlation with patients' evaluation of the dentists. Acta Odontol Scand. 2013; 71(1): 210-4.
14. Stipetić J, Celebić A, Jerolimov V, Vinter I, Kraljević S, Rajić Z. The patient's and the therapist's evaluation of bridges of different materials and age. Coll Antropol. 2000; 24 (1): 25-9.
15. Geiballa GH, Abubakr NH, Ibrahim EY. Patients' satisfaction and maintenance of fixed partial denture. Eur J Dent. 2016; 10(2): 250-3.
16. Tan K, Li AZ, Chan ES. Patient satisfaction with fixed partial dentures: a 5-year retrospective study. Singapore Dent J. 2005; 27(1): 23-9.
17. Malmstrom H, Dellanzo-Savu A, Xiao J, Feng C, Jabeen A, Romero M, Huang J, Ren Y. Success, clinical performance and patient satisfaction of direct fibre-reinforced composite fixed partial dentures - a two-year clinical study. J Oral Rehabil. 2015; 42(12): 906-13.
18. Creugers NH, De Kanter RJ. Patients' satisfaction in two long-term clinical studies on resin-bonded bridges. J Oral Rehabil. 2000; 27(7): 602-7.
19. Chezhian N, Abirami. Patient Satisfaction after Receiving a Fixed Partial Denture (FPD). J Pharm Sci & Res. 2016; 8(4): 208-9.

20. Goiato MC, Torcato LB, Dos Santos DM, Moreno A, Antenucci RM, de Carvalho Dekon SF. Quality of life and satisfaction of patients wearing implant-supported fixed partial denture: a cross-sectional survey of patients from Araçatuba city, Brazil. *Clin Oral Implants Res.* 2015; 26(6): 701-8.
21. Vallittu PK, Vallittu AS, Lassila VP. Dental aesthetics: A survey of attitudes in different groups of patients. *J Dent.* 1996; 24: 335-8.
22. Akarslan ZZ, Sadik B, Erten H, Karabulut E. Dental esthetic satisfaction, received and desired dental treatments for improvement of esthetics. *Indian J Dent Res.* 2009; 20(2): 195-200.
23. Stipetić J, Čelebić A, Čatović A, Lazić B, Pandurić J. Satisfaction with fixed-prosthetic therapy as assessed by patients. *Acta Stomatol Croat.* 1999; 33(3); 349-54.
24. Maghaireh GA, Alzraikat H, Taha NA. Satisfaction with Dental Appearance and Attitude toward improving Dental Esthetics among Patients attending a Dental Teaching Center. *J Contemp Dent Pract.* 2016; 17(1): 16-21.
25. Zagar M, Knezović Zlatarić D. Influence of esthetic dental and facial measurements on the Caucasian patients' satisfaction. *J Esthet Restor Dent.* 2011; 23(1): 12-20.
26. Xiaoxian Meng, Gilbert GH, Duncan RP, Heft MW. Satisfaction with dental appearance among diverse groups of dentate adults. *J Aging Health.* 2007; 19: 778-91.
27. Pockpa ZA, Didia EL, Mobio YS, Coulibaly NT, Djeredou KB. Evaluation of periodontal health of prosthetic abutments. Pilot study about 100 abutments of crowns and bridges. *Odontostomatol Trop.* 2015; 38(152): 39-47.
28. Lindhe J, Lang NP, Karring T. *Clinic parodontology and dental implantology* (acc. to 5th English issue). Zagreb: Nakladni Zavod Globus; 2010
29. Botelho MG, Ma X, Cheung GJ, Law RK, Tai MT, Lam WY. Long-term clinical evaluation of 211 two-unit cantilevered resin-bonded fixed partial dentures. *J Dent.* 2014; 42(7): 778-84.
30. Balshi TJ, Mingleorff EB. Maintenance procedures for patients after complete fixed prosthodontics. *J Prosthet Dent.* 1977; 37: 420-31.
31. Shenoy A, Shenoy N. Dental ceramics: An update *Conserv Dent.* 2010; 13(4): 195-203.
32. Anusavice KJ. *Phillips Science of Dental Materials.* Edition 11th. Philadelphia: Saunders; 2003.
33. McCabe JF, Walls AWG. *Applied Dental Materials.* Edition 9th. Oxford: Blackwell Publishing; 2008.
34. Vuličević Z. *Clinic application of materials in children's stomatology.* Beograd: BeoBook; 2010
35. Duymus ZY, Orbak R, Dilsiz A. Abrasion resistance of veneering materials to tooth brushing. *Dent Mater J.* 2003; 22(4): 460-6.
36. Lakatos S, Romînu M, Negruțiu M, Florița Z. The micro-leakage between alloy and polymeric materials in veneer crowns. *Quintessence Int.* 2003; 34(4): 295-300.
37. Romînu M, Lakatos S, Florița Z, Negruțiu M. Investigation of micro-leakage at the interface between a Co-Cr based alloy and four polymeric veneering materials. *J Prosthet Dent.* 2002; 87(6): 620-4.
38. Ohlmann B, Dreyhaupt J, Schmitter M, Gabbert O, Hassel A, Rammelsberg P. Clinical performance of posterior metal-free polymer crowns with and without fiber reinforcement: one-year results of a randomized clinical trial. *J Dent.* 2006; 34(10): 757-62.
39. Kostić L, Trifunović D, Zelić O, Radosavljević B. Microbiological investigation of supragingival dental plaque in patients treated with porcelain jacket and gold veneered resin crowns. *Stomatol Glas Srb.* 1989; 36(1): 49-56.
40. Kazazić L. Influence of fix prosthetic works on paradental health. Master paper: Faculty of Dentistry University in Sarajevo 2007; Sarajevo.
41. Liljemark WF, Bloomquist C. Human oral micro-bial ecology and dental caries and periodontal di-seases. *Crit Rev Oral Biol Med.* 1996; 7(2): 180-98.
42. Eick S, Glockmann E, Brandl B, Pfister W. Adhe-rence of *Streptococcus mutans* to various restora-tive materials in a continuous flow system. *J Oral Rehabil.* 2004; 31(3): 278-85.
43. Namen F, Galan J, Farias de Oliveira J, Rodrigo Derossi Cabreira, Costa e Silva Filho F, Balduino Souza A, de Deus G. Surface properties of dental polymers: measurements of contact angles, roughness and fluoride release. *Mat Res.* 2008; 3(11): 239-43.