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Assessing Patients' Awareness and Knowledge of Suggested Cleaning Procedures for Implant Prosthetic Restorations

İmplant Üstü Protetik Restorasyonların Temizliğinde Tercih Edilen Yöntemlerde Hastaların Farkındalık ve Bilgi Düzeylerinin Değerlendirilmesi

ABSTRACT

Objectives:

This study was conducted to evaluate the attitudes and knowledge of patients attending Ataturk University Faculty of Dentistry Prosthodontics Clinic regarding their preferences for providing professional implant care and awareness of implant-specific oral hygiene methods.

Material and Methods:

A questionnaire was administered to 130 randomly selected patients with fixed or removable prosthetic restorations on implants attending the Prosthodontics Clinic of Ataturk University Faculty of Dentistry.

Results:

It was found that patients answered yes to the questions of flossing (27.7%), use of interface brush (21.5%), use of mouth shower (7.7%), and use of mouthwash (80.8%) among the preferred methods for cleaning implant prosthetic restorations. When the rates of mouth shower use were analyzed in terms of the relationship between education and the use of mouth shower, a statistically significant relationship was found ($P < 0.001$).

Conclusion:

Dentists play a major role in explaining and raising awareness of their patients about the cleaning of implant prostheses and home care recommendations. The general awareness tendency of patients at this point is low. This study proved that patients need to know how to take care of and clean their dentures. Our study's hypothesis, which was founded on our clinical findings prior to the investigation, suggested that there might be variations in how implant-retained prosthetic restorations are cleaned depending on the age and educational level of the patient.

Key Words:

Dental implants, Implant maintenance, Oral hygiene, Survey

ÖZ

Amaç:

Bu çalışma Atatürk Üniversitesi Diş Hekimliği Fakültesi Protetik Diş Tedavisi Kliniği'ne başvuran hastaların profesyonel implant bakımı sağlama konusundaki tercihleri ve implanta özgü ağız hijyeni yöntemlerinin farkındalığına ait tutum ve bilgilerini değerlendirmek amacıyla yapılmıştır.

Gereç ve Yöntemler:

Atatürk Üniversitesi Diş Hekimliği Fakültesi Protetik Diş Tedavisi Kliniği'ne başvuran implant üstü sabit ya da hareketli protetik restorasyon kullanmakta olan rastgele seçilmiş 130 hasta üzerine anket uygulaması gerçekleştirilmiştir.

Bulgular:

Hastaların implant üstü protetik restorasyonların temizliğinde tercih ettikleri yöntemler arasında diş ipi kullanımı (%27.7), ara yüz fırçası kullanımı (%21.5), ağız duşu kullanımı (%7.7) ve ağız gargarası kullanımı (%80.8) sorularına evet cevabı verdikleri tespit edilmiştir. Ağız duşu kullanım oranları eğitim ve ağız duşu kullanımı arasındaki ilişki açısından incelendiğinde istatistiksel olarak anlamlı bir ilişki bulunmuştur ($P < 0.001$).

Sonuç:

Diş hekimleri hastalarının implant üstü protezlerin temizliği ve evde bakım önerilerini anlatma ve bilinçlendirme konusunda majör rol oynamaktadır. Hastaların bu noktada genel farkındalık eğilimleri az düzeydedir. Bu çalışma ile hastaların protez temizliği ve bakımı konusunda bilgilendirilmesi gerektiği gösterilmiştir.

Anahtar Sözcükler:

Dental implant, Implant bakım farkındalığı, Oral hijyen, Anket çalışması

INTRODUCTION

Edentulousness is a critically important condition that affects an individual's quality of life (1). An ideal prosthetic rehabilitation is essential to maintain lost chewing function and eliminate aesthetic and phonation deficiencies (2). Implant therapy, which is a type of treatment that replaces missing or lost teeth, is an effective treatment method with a success and survival rate of over 90% (3). In order for implant treatment to be successful, it is a multidisciplinary treatment that requires appropriate evaluation by an oral radiologist, maxillofacial surgeon, periodontist and prosthodontist from the initial planning stage. After the implant is placed, an attempt is made to increase the implant survival rate with check-ups, radiographs and routine maintenance checks (4). To maintain peri-implant tissue health, in addition to the supportive care treatments performed by the physician, the most important are the daily oral hygiene practices that the patient performs at home (5,6). The rapid increase in the frequency of implant treatment has increased the importance of peri-implant diseases and dental implant cleaning and maintenance has become vital (7). Health of peri-implant tissue; It is affected by the location, diameter and surface of the implant, the type of prosthesis applied, the patient's current systemic condition, smoking habit and the ease or difficulty of accessing the area to perform proximal hygiene (8). The form and relationships of healthy teeth and gums differ from those of implant-supported prosthetic structures, therefore following an implant-supported prosthetic restoration, the patient needs to follow specific home care protocols and oral hygiene guidelines (9). There is little literature supporting implant hygiene care practices performed by the patient at home (7). Edentulousness is a condition mostly seen in the geriatric population. Especially recently, the number of elderly population has been increasing.

Preventing oral diseases in geriatric patients is even more important as it will improve the patient's quality of life (10). Although dental diseases are chronic diseases, they are very important in geriatric patients due to the systemic effect of the oral flora caused by the patient's existing systemic diseases or independently of poor oral hygiene. Treatment of edentulism can be provided with implants or tooth-supported fixed or removable protheses (11).

The geriatric population, which constitutes a significant portion of our patients who need edentulous treatment, is in search of alternative dentures due to the low retention of traditional removable dentures and their inability to chew food comfortably (12). Cleaning implant- supported restorations requires special precision. Improper crown contour paves the way for peri-implant diseases as it makes cleaning more difficult. Particularly, implant restorations with a wide exit angle are considered to be dangerous areas. Interface cleaning tools are required in addition to tooth brushing to clean the implant and crown junction area.13 Tooth brushing, dental floss, interdental brush, oral irrigator, and denture cleaning tablets are used to clean implant-supported prosthetic restorations. Tooth brushing is the most commonly used method of mechanically cleaning plaque (14).

However, additional techniques are needed for cleaning interproximal areas. One of the cleaning tools frequently used in cleaning interdental areas is dental floss. There are 2 types: waxed or unwaxed. However, the patient's hand manipulation is important for its use. It is generally used for cleaning areas with tight tooth contact. Its effective use may be difficult, especially in geriatric patients. Interdental brushes can be used more easily in areas with larger contact areas. There are different shapes and sizes available in the market. It has been found that using an interdental brush is more effective than using dental floss in cleaning plaque in interproximal areas (15). Since there is a lack of awareness in patients, especially in the cleaning of interproximal areas, dentists should take a more active role in raising their patients' awareness on this issue (16). Implant-supported prosthetic restorations are one of the

most preferred treatment methods today. Dental implants require constant care and monitoring. Maintaining general and oral health, professional implant care and careful home care affect the long-term success of implants (17).

Awareness and motivation to protect oral health; it is very important to ensure the health and integrity of teeth, implant surroundings and periodontal tissues. In previous peri-implant outcome studies, oral hygiene instructions were recommended to patients, but since there were no specific clinical guidelines, it was observed that there were differences and deficiencies in the patients' methods of providing oral hygiene (15). In our study, patients' preferences, and awareness about the cleaning of their implant-supported dentures will be investigated.

MATERIAL and METHODS

A survey was conducted on 100 randomly selected patients who applied to Ataturk University Faculty of Dentistry, Department of Prosthodontics. The inclusion criteria for the patients determined for the survey application were determined as patients aged 20 and over and having fixed or removable prosthetic restorations on implants. The survey forms applied to the patients include questions regarding demographic data, knowledge, awareness and practices of the techniques used in implant-supported prosthesis cleaning. All questions were asked of the patients. They were told that they had to choose only one option from the options presented in the survey forms in the response format. The data analysis was performed using the IBM SPSS 22.0 software package (SPSS Inc., Chicago, IL, USA). Descriptive statistics for numerical variables are presented as mean ± standard deviation, while categorical variables are displayed as frequency and percentage. Categorical variables were evaluated with Pearson Chi-square or Fisher Exact Test. Results for $P < 0.05$ were considered statistically significant.

RESULTS

In this study, 49.2% of the participants are women and 50.8% are men. 83.1% of the participants are married and 16.9% are single. According to education level, 31.5% of the participants are primary school graduates, 36.2% are high school graduates and 32.3% are undergraduate and postgraduate graduates. The age range of the participants is between 19-70; 4.6% are 70 years old and over, 76.9% are between 40-69 years old, and 18.5% are 19-39 years old. 98.5% of the participants answered 'yes' to the question *"Do you brush your teeth?"* In our study, the answer to the question of the frequency of denture cleaning was 'twice a day', mostly for mechanical brushing (63.8%).

In this study, the preferred methods for cleaning implant-supported prosthetic restorations were the use of dental floss (27.7%), the use of an interdental brush (21.5%), the use of oral irrigators (7.7%), and the use of mouthwash (80.8%). He answered yes. 32.3% of the participants stated that they had not used any interdental cleaning tool before.

Table 1. Clinical characteristics of the patients.

Characteristics	Overall (n = 130)	Tooth brushing yes (n = 128; 98.5%)	No tooth brushing (n = 2.1; 5%)	p-value
Age range				
19-39	24 (18.5%)	24 (18.8%)	0 (0%)	
39-69	100 (76.9%)	99 (77.3%)	1 (50%)	0.123
>=70	6 (4.6%)	5 (3.9%)	1 (50%)	
Education				
A.	41 (31.5%)	39 (30.5%)	2 (100%)	0.098
B.	47 (36.2%)	47 (36.7%)	0 (0%)	
C.	42 (32.3%)	42 (32.8%)	0 (0%)	

Characteristics	Overall (n = 130)	Dental floss uses yes (n = 36; 27.7%)	No dental floss (n = 94; 72.3%)	p-value
Age range				
19-39	24 (18.5%)	16 (44.4%)	8 (8.5%)	
39-69	100 (76.9%)	20 (55.6%)	80 (85.1%)	0.000
>=70	6 (4.6%)	0 (0%)	6 (6.4%)	
Education				
A.	41 (31.5%)	2 (20%)	39 (32.5%)	
B.	47 (36.2%)	0 (15.7%)	47 (39.2%)	0.001
C.	42 (32.3%)	8 (80%)	34 (28.3%)	

Characteristics	Overall (n = 130)	Using an interdental brush Yes (n = 28; 21.5%)	Using an interdental brush No (n = 102; 78.5%)	p-value
Age range				
19-39	24 (18.5%)	7 (25%)	17 (16.7%)	
39-69	100 (76.9%)	21 (75%)	79 (77.5%)	0.348
>=70	6 (4.6%)	0 (0%)	6 (5.9%)	
Education				
A.	41 (31.5%)	9 (32.1%)	32 (31.4%)	
B.	47 (36.2%)	12 (42.9%)	35 (34.3%)	0.595
C.	42 (32.3%)	7 (25%)	35 (34.3%)	

Characteristics	Overall (n = 130)	Mouthwash User (n = 105; 80.8%)	Not Using Mouthwash (n = 25; 19.2%)	p-value
Age range				
19-39	24 (18.5%)	16 (15.2%)	8 (32%)	0.143
39-69	100 (76.9%)	84 (80%)	16 (64%)	
>=70	6 (4.6%)	5 (4.8%)	1 (4%)	
Education				
A.	41 (31.5%)	29 (27.6%)	12 (48%)	
B.	47 (36.2%)	38 (36.2%)	9 (36%)	0.074
C.	42 (32.3%)	38 (36.2%)	4 (16%)	
Characteristics	Overall (n = 130)	Oral Irrigator User (n = 10; 7.7%)	Not Using Oral Irrigator (n = 120; 92.3%)	p-value
Gender				
Male	66 (50.8%)	4 (40%)	62 (51.7%)	0.528
Female	64 (49.2%)	6 (60%)	58 (48.3%)	
Education				
A.	41(31.5%)	2 (20%)	39 (32.5%)	0.00
B.	47 (36.2%)	0 (15.7%)	47 (39.2%)	
C.	42 (32.3%)	8 (80%)	34 (28.3%)	

DISCUSSION

Long-term success of implants requires a gentle daily home care routine. Because biofilm causes inflammation and peri-implant disease around implant-supported dentures, the goal of professional care and oral hygiene protocols for home care procedures should be directed towards eliminating biofilm. For the long-term success of the implant and its restoration, oral hygiene instructions must include comprehensive verbal guidance and visual demonstration (18). In patients undergoing implant surgery, implant hygiene care procedures should be started immediately following surgery in the one-stage system, and as soon as the implant healing cap is installed in the two-stage system (19). In some cases, mechanical plaque control may be contraindicated immediately after surgery, and in these cases, it has been stated that it is appropriate to use chemical agents such as Chlorhexidine (4). Implant-supported restorations can be used to meet a variety of patient needs, including implant-supported single crowns, implant-supported partial fixed dentures, implant-supported full arches, implant-supported partial removable dentures, and implant-supported fully removable dentures (overdentures). Each type of restoration/prosthesis requires careful planning, precise care coordination, and long-term collaboration with the patient to achieve a lasting result (20).

Dental implant-supported restorations require oral hygiene protocols similar to standard oral hygiene procedures for home care procedures, with some minor exceptions.

Oral hygiene protocols for home care procedures instructions should include teaching patients how to brush their teeth twice daily with a low-abrasive toothpaste and how to use interdental aids, according to a set of clinical practice guidelines for dental implant care. To remove bacterial plaque, it is recommended to clean the implants twice a day, that is, with a soft toothbrush or electric toothbrushes to have a mechanical cleaning effect (5). As a result, they showed that plaque removal rates were better when patients used an electric toothbrush compared to manual tooth brushing. It has been stated that in patients using implant-supported fixed prosthesis with screws, it is possible that the occlusal screws may loosen due to the mechanical vibration of the electric toothbrush (21). Interproximal plaque accumulation can be controlled by using dental floss or interdental brushes in implant-supported dentures. The mesial and distal parts of the teeth should be flossed once a day according to guidelines. Setti et al. In his survey study on the hygienic care of patients using full-arch fixed implant prosthesis; 46.3% of the patients showed that they cleaned their implant-supported dentures at home twice a day, 51.2% of the patients did not experience any difficulties during hygiene practices, and 51.2% of the patients showed that they used the angled implant brush only once a day (22).

Pons *et al.* (23) in their survey study, they showed that 54% of the patients had insufficient access to cleaning the proximal points, and at this point they could use electric toothbrushes more effectively. 46% of the patients stated that they did not use dental floss, the use of interdental brushes was 48%, the least used oral hygiene application was dental floss and the usage rate was 4.7%, and in the majority of cases (56.6%), mouthwashes were used as complementary oral hygiene. They stated that it was not used as a procedure. In general, it is seen that patients are not informed by their dentists as expected. It is known that patients' knowledge about the risks associated with prosthesis care or lack of hygiene around the implant is insufficient in most cases. Peri-implant disease has been associated with inadequate oral hygiene education by dentists. The present findings are consistent with those of a previous study by Abrahamsson *et al.* (24). In our study, 56.2% of the participants stated that they were informed about denture cleaning methods by their physician; 36.9% stated that information was inadequate, and 6.9% stated that information was not provided. While 9.2% of the participants answered yes, very good about their level of knowledge about denture cleaners, 79.2% answered yes but not enough, and 11.5% answered no. According to the data, physicians partially informed patients (56.2%); However, it was determined that this information did not effectively increase the knowledge level of the patients. All things considered, socioeconomic levels of patients and the education are related to their oral health status. A prior study discovered a favorable correlation between interest in oral health and socioeconomic stability and educational attainment (25).

In our study, among the methods of denture cleaning; significant correlation was discovered between dental floss use and oral irrigator use and education level ($P < 0.001$). 83.3% of people who use oral irrigators stated that using an oral irrigator is an effective method as a reason for using it. Reasons for not using oral irrigator; Among the participants, the following were found to be high cost (7.3%), doubt about effectiveness (1.6%), difficulty in obtaining (16.1%) and lack of interest (75%). The rate of oral irrigator use in women (9.4%) was found to be higher than in men (6.1%). When oral irrigator usage rates were examined in terms of their relationship with education level, a statistically significant relationship was found ($P < 0.001$); It has been determined that 80% of people using oral irrigators have undergraduate or postgraduate education. Oral irrigator usage rate is directly related to education level. 50% of people using oral irrigators are between the ages of 19-39, and as age increases, the rate of using oral irrigators decreases significantly (40% between the ages of 40-69, and 10% for those over 70). However, no significant relationship was found between marital status and oral irrigator use. It was found that 78% of the primary school graduate participants who did not use oral irrigators were due to lack of interest. When the reasons for not using oral irrigators at undergraduate and graduate education levels

are evaluated, the rate of lack of interest is found to be lower than that of primary school graduates (66.7%), but this rate is still high. No statistically significant difference was found between education level and reasons for not using oral irrigator. While the rate of lack of interest among participants between the ages of 19-39 was found to be 40% among the reasons for not using an oral irrigator; The rate of lack of interest in individuals aged 40 and over has increased significantly and is at an average level of 82.4%. This shows that the awareness levels of older individuals are much lower ($P < 0.001$). Smoking and its relationship with oral hygiene have been the subject of many articles. Previous studies in the literature support that smoking disrupts oral hygiene (26).

The findings of this study regarding the higher rate of good denture and oral hygiene among non-smokers compared to smokers are consistent with the results of several previous studies (27,28). Some studies (25,28) have claimed that patients pay more attention to denture cleaning after receiving updated instructions. These findings supported the findings of earlier research, which indicated that many patients needed to be educated about denture cleaning and maintenance.

Limitations of this study; certain hygiene methods can be evaluated more comprehensively by recommending certain hygiene methods to the patient and examining the effectiveness and reliability of the methods by providing oral hygiene control at certain periods.

CONCLUSION

When implant-supported dentures used for edentulous patients are evaluated in terms of the length of construction phases and cost, post-treatment oral hygiene and denture care are critical for long-lasting use. Dentists play an important role in educating individuals about oral hygiene and raising awareness. In this study, the knowledge and attitudes of patients using implant-supported prosthetics regarding the preferred methods for cleaning implant-supported prosthetic restorations were evaluated. Meticulous planning is required regarding awareness. Maintaining patient motivation is a major responsibility of clinicians. It is possible to prevent periodontal diseases by giving detailed information to patients about their oral hygiene habits and ensuring that they maintain adequate oral and dental hygiene. As a result, clinicians should advise and motivate the patient regarding implant-supported denture care and oral hygiene procedures. Patients' preferences regarding implant-supported denture cleaning methods should be investigated and information regarding implant care protocols should be provided, continuing education programs should continue to be researched to improve patient outcomes, and the current oral hygiene status should be checked periodically.

Ethics Committee Approval:
The study was approved by the relevant institution administration.

Author contribution statement:
Concept - T.Ş., Z.Ç., F.B.; Design - T.Ş., Z.Ç., F.B.; Supervision - T.Ş., Z.Ç., F.B.; Resources - T.Ş., Z.Ç., F.B.; Materials - T.Ş., Z.Ç.; Data Collection and/or Processing - T.Ş., Z.Ç.; Analysis and/ or Interpretation - T.Ş., Z.Ç., F.B.; Literature Search - T.Ş., Z.Ç.; Writing Manuscript - T.Ş., Z.Ç.; Critical Review - F.B.

Informed Consent:
Written informed consent was obtained from participants who participated in this study.

Conflict of Interest:
The author declare that they have no conflict of interest.

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