



Original Article

Assessment of oral care habits in patients with fixed dental prostheses: A pilot study

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ABSTRACT

Objectives: The aim of the present study was to evaluate patients' oral care habits with fixed dental prostheses and the level of oral hygiene instructions they received from dental professionals.

Material and Methods: A short questionnaire was created containing 12 questions and focusing on four main parts. The first part of the questions included patient demographic information while the remaining part assisted patient's oral care habits and instructions that patients received from their dentists and dental hygienists.

Results: The study population consisted of 259 patients in which 59% of them were female. Nearly 40% of the patients believed that they did not receive clear information and instructions from their dentists or hygienists on how to clean their fixed dental prosthesis. Although, most of them did visit their dentists and hygienists after they completed the fixed prosthesis treatment. Around 57% of the patients revealed that they did not try to seek information about the correct way of cleaning your fixed dental prosthesis. When they were asked about their cleaning habits of the fixed prosthesis, the majority reported that they use both toothbrush and flossing methods for cleaning.

Conclusion: Most of patients with dental prosthesis believe they are lacking instructions about the proper method for optimal oral hygiene. Meanwhile, patients who believed that they received enough instructions with regard optimal oral hygiene can show better commitment toward daily oral care.

Keywords: Fixed dental prosthesis, Oral hygiene, Dental care, Dental plaque

INTRODUCTION

Fixed dental prostheses, such as crowns and bridges, are commonly used to restore the appearance and function of badly broken teeth.^[1,2] A dental bridge, which is still regarded as a good treatment option for replacing missing teeth, remains popular among patients and dentists, and it continues to exhibit high success rate after long-term evaluation.^[3]

Mechanical and biological durability are the main criteria that determine the success of fixed prostheses.^[4] The most common biological problems associated with this treatment are dental caries, gingival inflammation, and periodontal disease.^[5] Indeed, some reports have indicated that dental caries is the primary cause of the failure of fixed prostheses.^[2] Dental caries subsequently occurs due to dentogingival plaque accumulation, which is seen frequently in patients with improper oral hygiene.^[6] Subsequently, secondary caries around the margins of fixed prostheses may develop and lead to failure of the treatment, as well as tooth extraction.^[7]

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Oral hygiene is critical for maintaining oral health and enhancing the long-term prognosis of dental treatments, regardless of the type of treatment.^[8] However, some dental procedures (particularly restorations) require additional care to avoid any complications. For instance, fixed dental prostheses, such as a fixed bridge or crown restoration, which involve tooth and restoration contact at the outer surface, can readily cause carious or periodontal problems if not done properly.^[9] Moreover, some reports have revealed that factors such as open prosthesis margins or over-contoured crowns can be associated with poor gingival health around fixed prostheses.^[10]

A dental team, represented primarily by a dentist and dental hygienist, bears great responsibility for providing their patients with proper treatment. Furthermore, their role includes providing patients with adequate instructions for optimal oral hygiene after treatment. Several studies have indicated that educating patients about the importance of proper oral hygiene is associated with enhanced oral conditions.^[11] Indeed, some studies have demonstrated that the frequent, careful, professional cleaning of the teeth of patients with fixed dentures may help maintain satisfactory oral hygiene.^[12]

The patient themselves has the responsibility of taking care of their own teeth on a daily basis and seeking treatment when they notice an issue related to the condition of his teeth. As part of their duties, dentists are expected to inform their patients about the importance of having optimal oral hygiene. However, when patients receive fixed dental prostheses, they may not always receive instructions on the proper cleaning methods used with these prostheses. Routine dental care (which most people with normal dentition are familiar with) may not entirely apply for people with fixed prostheses. For instance, fixed dental bridges need to be cleaned from underneath to remove accumulated food and maintain healthy periodontal tissue. For this purpose, special cleaning devices, such as super floss, are used. However, information in the literature is lacking about the amount of instruction that patients with fixed prostheses receive on properly cleaning their teeth and prostheses.

The aim of the present pilot study was to evaluate patients' oral care habits with fixed dental prostheses as well as the level of information they received from dental professionals on this subject. In addition, this study evaluated whether factors such as gender, age, and level of education influence patients' awareness.

MATERIAL AND METHODS

Ethics approval

The study protocol was approved by *The Ethics Committee at the College of Dentistry in Qassim University, Saudi Arabia.*

All methods were performed in accordance with the relevant guidelines and regulations determined by the Ethics Committee.

Questionnaire

In this study, a short questionnaire was created to examine patients' oral care habits after they had received dental treatment that included fixed dental prostheses. Its questions were designed and approved following a discussion between prosthodontists and dental hygienists. The final version of the questionnaire contained 12 multiple-choice questions. The first part of the questionnaire covered general patient information: gender, age, and level of education. The second part focused on assessing the patients' awareness of oral hygiene and the instructions that they received from their dentists.

The questionnaire was submitted to patients who had previously been treated with fixed dental prostheses, such as laminate veneers, full veneers, or fixed partial dentures. The study included patients aged 18 years and older who were able to sign informed consent forms.

The questionnaire was distributed to previously treated patients by email. A hard copy of the questionnaire was also distributed to several dental clinics to be filled out by patients in the waiting rooms. The participating patients were invited to fill out the questionnaire by answering all the questions. When the completed questionnaires were submitted, the author checked that all the questions had been answered. All incomplete questionnaires were excluded from the study. A total of 500 copies of the questionnaire were distributed to patients from January 2021 to July 2021. This study followed the reporting guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology checklist.^[13]

Statistical analysis

All the collected data were then extracted from the completed forms and saved in a Microsoft Excel spreadsheet. Statistical evaluation was performed using SPSS software version 27 (SPSS Inc., Chicago, IL, USA).

Descriptive statistical calculations were performed to generate the means and standard deviations. For the evaluation of patients' attitudes and awareness of their oral hygiene, a Chi-squared test was used, followed by a Tukey's *post hoc* test to detect significance within subgroups. The evaluation was done based on three categories: Gender, age, and level of education. The results were expressed as mean \pm standard deviation; $P < 0.05$ was accepted as being statistically significant.

RESULTS

[Table 1] summarizes the demographic characteristics of the patients in this study. The total sample size was 259 patients, of whom 59% were female. The response rate was approximately 52%. The main reason for non-responses was the patients' unwillingness to spend time filling out the questionnaire. The patients included in this study were distributed in relatively equal amounts between all established age groups. Many patients (around 74%) had a college degree or higher qualification.

Patients' oral care habits and the level of information received from dentists

[Table 2] shows the answers obtained from all participating patients. Nearly 40% believed that they did not receive clear information and instructions from their dentists or hygienists on how to clean their fixed dental prostheses. Although most of them visited their dentists after they completed the fixed prosthesis treatment, around 57% of the patients revealed that they did not try to seek information about the correct way to clean their fixed dental prosthesis. When asked about their cleaning habits with their fixed dental prosthesis, the majority reported that they used both a toothbrush and floss for cleaning.

Gender differences

The obtained data were analyzed based on three categories: Gender, age, and level of education. The patients' responses

Table 1: Patients' demography ($n=259$).

	Response	
Gender		
Female	59.16%	153
Male	40.84%	106
Age group		
18–24	12.36%	32
25–34	19.31%	50
35–44	15.05%	39
45–54	22.01%	57
55–64	12.74%	33
65+	18.53%	48
Level of education		
Postgraduate education	22.14%	57
University/college education	52.29%	137
High school education	23.28%	61
Less than high school	2.29%	4
Time since the treatment		
< 2 years	33.5%	61
2–5 Years	25.3%	46
5–10 years	12.1%	22
More than 10 years	29.1%	53
Not sure (not included in the percentage)	--	77

are summarized in [Table 3] according to gender. A significant difference between genders was found when participants were asked how often they cleaned their teeth and fixed dental prosthesis ($P = 0.002$). The *post hoc* test revealed that females cleaned their teeth more frequently than males ($P = 0.003$). Furthermore, a statistical difference existed between genders in the methods they used for cleaning their teeth ($P = 0.013$). The *post hoc* test revealed that females used a toothbrush with floss and/or other cleaning devices significantly more than males ($P = 0.011$).

Differences based on age group

As for age groups, there were no significant differences between the age groups for many of the answers [Table 4]. However, statistically significant differences were found in three questions. The first was the question about patients' visits to a dental hygienist after they received a fixed dental

Table 2: Patients' oral care habits and level of information received from dentists.

	Do you think you received clear information and instructions from your dentist how to clean your fixed dental prosthesis?
No	40%
Yes	60%
	Have you visited your dentist after you received the fixed dental prosthesis?
No	39%
Yes	61%
	Have you visited dental hygienist after you received your fixed dental prosthesis?
Just once	19%
No	33%
Yes, regularly	48%
	How often do you clean the teeth with the fixed dental prosthesis?
Always	55%
Rarely	20%
Sometimes	25%
	How do you clean your fixed dental prosthesis?
I rarely clean it	10%
Only using dental brush	10%
Only using dental floss	7%
Using dental brush with floss and/or other cleaning device	73%
	Did you try to seek information about the correct way of cleaning your fixed dental prosthesis?
No	57%
Yes	43%

Table 3: Patients' responses based on gender.

Questions	Answer choices	Gender		Total (%)	P-value
		Female (%)	Male (%)		
Do you think you received clear information and instructions from your dentist how to clean your fixed dental prosthesis?	No	60	43	103	0.827
	%	58	42	100	
	Yes	93.0	63.0	156.0	
	%	60	40	100	
Have you visited your dentist after you received the fixed dental prosthesis?	No	55	44	99	0.365
	%	56	44	100	
	Yes	98	62	160	
	%	61	39	100	
Have you visited dental hygienist after you received your fixed dental prosthesis?	No	52	35	87	0.346
	%	60	40	100	
	Just once	24	24	48	
	%	50	50	100	
	Yes, regularly	77	47	124	
	%	62	38	100	
How often do you clean the teeth with the fixed dental prosthesis?	Rarely	23	29	52	0.002
	%	44	56	100	
	Sometimes	32	32	64	
	%	50	50	100	
	Always	98*	45*	143.0	
	%	69	31	100	
How do you clean your fixed dental prosthesis?	I rarely clean it	13	9	22	0.015
	%	59	41	100	
	Only using dental brush	24	31	55	
	%	44	56	100	
	Only using dental floss	5	10	15	
	%	33	67	100	
	Using dental brush with floss and/or other cleaning device	111*	56*	167	
	%	66	34	100	
Do you use super floss (special dental floss used to clean under dental bridges) with your dental bridge	No	49	28	77	0.131
	%	64	36	100	
	Yes, but rarely	22	27	49	
	%	45	55	100	
	Yes, always	27	20	47	
	%	57	43	100	
Did you try to seek information about the correct way of cleaning your fixed dental prosthesis?	No	90	58	148	0.511
	%	61	39	100	
	Yes	63	48	111	
	%	57	43	100	

prosthesis ($P = 0.013$). The *post hoc* test revealed that a statistical difference existed in the 18–24 age group, which showed fewer visits to dental hygienists compared to other age groups ($P = 0.01$). The second question was whether patients used super floss (special dental floss used to clean under dental bridges) with their dental bridges ($P = 0.011$). The *post hoc* test revealed that a statistical difference existed in the 25–34 age group, as they used super floss more frequently than the other age groups ($P = 0.001$). Finally, the third question revealed a significant difference between age groups regarding whether patients sought information about the

correct way to clean their fixed dental prostheses ($P = 0.02$). The *post hoc* test revealed that a statistical difference existed in the 25–34 age group, as they sought information significantly more than the other age groups ($P = 0.02$).

Differences based on level of education

Patients with an education level less than high school reported significantly fewer visits to hygienists compared to the other groups ($P = 0.040$). No other significant differences related to education levels were found [Table 5].

Table 4: Patients' responses based on age group.

Question	Answer choices	Age group						Total	P-value
		18–24	25–3	35–44	45–54 (%)	55–64	65		
Do you think you received clear information and instructions from your dentist how to clean your fixed dental prosthesis?	No	14 13.6%	18 17.5%	23 22.3%	20 19.4%	10 9.7%	18 17.5%	103 100.0%	0.137
	Yes	18 11.5%	32 20.5%	16 10.3%	37 23.7%	23 14.7%	30 19.2%	156 100.0%	
Have you visited your dentist after you received the fixed dental prosthesis?	No	15 15.2%	21 21.2%	19 19.2%	24 24.2%	7 7.1%	13 13.1%	99 100.0%	0.073
	Yes	17 10.6%	29 18.1%	20 12.5%	33 20.6%	26 16.3%	35 21.9%	160 100.0%	
Have you visited dental hygienist after you received your fixed dental prosthesis?	No	10 11.5%	19 21.8%	15 17.2%	22 25.3%	8 9.2%	13 14.9%	87 100.0%	0.013
	Just once	13* 27.1%	5 10.4%	9 18.8%	11 22.9%	5 10.4%	5 10.4%	48 100.0%	
	Yes, regularly	9 7.3%	26 21.0%	15 12.1%	24 19.4%	20 16.1%	30 24.2%	124 100.0%	
How often do you clean the teeth with the fixed dental prosthesis?	Always	12 8.4%	23 16.1%	21 14.7%	32 22.4%	23 16.1%	32 22.4%	143 100.0%	0.092
	Rarely	7 13.5%	13 25.0%	7 13.5%	9 17.3%	5 9.6%	11 21.2%	52 100.0%	
	Sometimes	13 20.3%	14 21.9%	11 17.2%	16 25.0%	5 7.8%	5 7.8%	64 100.0%	
How do you clean your fixed dental prosthesis?	I rarely clean it	4 18.2%	4 18.2%	4 18.2%	7 31.8%	0 0.0%	3 13.6%	22 100.0%	0.183
	Only using dental brush	4 7.3%	14 25.5%	10 18.2%	12 21.8%	5 9.1%	10 18.2%	55 100%	
	Only using dental floss	2 13.3%	5 33.3%	3 20.0%	4 26.7%	0 0.0%	1 6.7%	15 100.0%	
	Using dental brush with floss and/or other cleaning device	22 13.2%	27 16.2%	22 13.2%	34 20.4%	28 16.8%	34 20.4%	167 100.0%	
Do you use super floss (special dental floss used to clean under dental bridges) with your dental bridge?	I don't have dental bridge	8 9.3%	12 14.0%	14 16.3%	20 23.3%	14 16.3%	18 20.9%	86 100.0%	0.011
	No	12 15.6%	9 11.7%	10 13.0%	14 18.2%	14 18.2%	18 23.4%	77 100.0%	
	Yes, always	3 6.4%	19* 40.4%	6 12.8%	11 23.4%	2 4.3%	6 12.8%	47 100.0%	
	Yes, but rarely	9 18.4%	10 20.4%	9 18.4%	12 24.5%	3 6.1%	6 12.2%	49 100.0%	
Did you try to seek information about the correct way of cleaning your fixed dental prosthesis?	No	19 12.8%	19* 12.8%	20 13.5%	33 22.3%	23 15.5%	34 23.0%	148 100.0%	0.016
	Yes	13 11.7%	31* 27.9%	19 17.1%	24 21.6%	10 9.0%	14 12.6%	111 100.0%	

DISCUSSION

The placement of a fixed dental prosthesis always involves the risk of developing dental caries or periodontal disease if proper oral hygiene is not maintained. Several studies have demonstrated that the presence of a fixed dental prosthesis in the mouth may facilitate plaque accumulation, which may have a negative effect on gingival conditions around teeth.^[14] These clinical problems are initially manifested by

gingival inflammation, recession, and pocket formation. Patients' lack of motivation is considered a key factor in poor oral hygiene. Thus, patient education and motivation should be seen as essential parts of any treatment. Patients who exhibit little or no motivation need to be encouraged by their dentists to enhance their oral hygiene.^[15] Numerous studies have revealed that good patient education and motivation are associated with improvement of oral hygiene.^[16]

Table 5: Patients' responses based on level of education.

Question	Answer choices	Education level				Total	P value
		Less than high school	High school education	University/ Collage education	Postgraduate education		
Do you think you received clear information and instructions from your dentist how to clean your fixed dental prosthesis?	No	1 1.0%	24 23.3%	54 52.4%	24 23.3%	103 100.0%	0.918
	Yes	3 1.9%	37 23.7%	83 53.2%	33 21.2%	156 100.0%	
Have you visited your dentist after you received the fixed dental prosthesis?	No	3 3.0%	26 26.3%	47 47.5%	23 23.2%	99 100.0%	0.285
	Yes	1 0.6%	35 21.9%	90 56.3%	34 21.3%	160 100.0%	
Have you visited dental hygienist after you received your fixed dental prosthesis?	No	1 1.1%	25 28.7%	46 52.9%	15 17.2%	87 100.0%	0.045
	Just once	3 6.3%	12 25.0%	23 47.9%	10 20.8%	48 100.0%	
	Yes, regularly	0* 0.0%	24 19.4%	68 54.8%	32 25.8%	124 100.0%	
How often do you clean the teeth with the fixed dental prosthesis?	Rarely	3 5.8%	13 25.0%	23 44.2%	13 25.0%	52 100.0%	0.051
	Sometimes	1 1.6%	19 29.7%	34 53.1%	10 15.6%	64 100.0%	
	Always	0 0.0%	29 20.3%	80 55.9%	34 23.8%	143 100.0%	
How do you clean your fixed dental prosthesis?	I rarely clean it	0 0.0%	5 22.7%	11 50.0%	6 27.3%	22 100.0%	0.611
	Only using dental brush	1 1.9%	12 22.2%	27 50.0%	14 25.9%	54 100.0%	
	Only using dental floss	1 6.7%	3 20.0%	5 33.3%	6 40.0%	15 100.0%	
	Using dental brush with floss and/or other cleaning device	2 1.2%	41 24.6%	94 56.3%	30 18.0%	167 100.0%	
		2 2.6%	17 22.1%	42 54.5%	16 20.8%	77 100.0%	
Do you use super floss (special dental floss used to clean under dental bridges) with your dental bridge	No	2 2.6%	17 22.1%	42 54.5%	16 20.8%	77 100.0%	0.575
	Yes, always	0 0.0%	10 21.3%	22 46.8%	15 31.9%	47 100.0%	
	Yes, but rarely	1 2.0%	16 32.7%	25 51.0%	7 14.3%	49 100.0%	
Did you try to seek information about the correct way of cleaning your fixed dental prosthesis?	No	3 2.0%	40 27.0%	73 49.3%	32 21.6%	148 100.0%	0.369
	Yes	1 0.9%	21 18.9%	64 57.7%	25 22.5%	111 100.0%	

In this study, most patients admitted that they did not try to search for information regarding the proper methods of oral hygiene care for fixed dental prostheses. This could be related to the patients' understanding that the oral hygiene methods will be similar to conventional methods used with normal dentition. Another possible explanation is that patients generally rely strongly on the instructions they receive from their dentists or hygienists. Indeed, dental professionals, such as dentists and hygienists, are considered the main source

of information for patients regarding the proper way to maintain oral health. This is supported by the idea that most patients continued visiting their dentists and hygienists for follow-ups, as observed in this study. Thus, if a dentist, for instance, did not provide their patients with full instructions, this could indicate to the patients that no special care is required for their teeth.

The findings indicated that almost half of the patients did not go to their dentists and hygienists regularly, which was

similar to the results reported in several other studies.^[17,18] However, this percentage was much higher than in a study conducted by Steele *et al.*,^[19] who reported that around 28% of patients from various age groups did not regularly visit a dentist.

Higher percentages of patients making regular dental visits were seen, particularly among females and in patients with higher education levels. Periodic recall appointments have been reported in the literature as an essential factor in maintaining long-term oral health.^[20,21] However, some studies have raised concern over the cost-effectiveness of recall appointments for routine dental check-ups.^[22] In their Dental Recall Guidelines, the National Institute for Health and Care Excellence recommends dental check intervals of 3 months–24 months between recall appointments for adult patients who have the ability to maintain oral health practices.^[23]

Interestingly, a high percentage of patients reported the use of a toothbrush with floss and/or other cleaning devices for their teeth. These findings are similar to the results reported in other studies.^[24] The proper oral health practices manifested by proper tooth brushing and flossing are considered effective strategies for the prevention of oral disease.

Most participants (around 73%) reported the use of interdental cleaning aids in addition to interdental brushes. The use of interdental cleaning aids is believed to be effective in preventing plaque accumulation.^[14] A study by Jackson *et al.*^[25] revealed a reduction in inflammation and periodontal problems associated with the use of interdental cleaning aids in periodontal patients. This finding was more evident on the proximal tooth surfaces when the interdental cleaning aids were compared with the use of only brushes in combination with dental floss.^[26] Moreover, the previous studies have reported a higher incidence of plaque accumulation in patients with fixed partial dentures compared to single crowns.^[6] This can be explained by the difficulty in cleaning and limited access to proximal areas and below the pontics of fixed partial dentures compared to single-crown restorations.

In terms of gender, the study findings revealed more commitment to oral hygiene among female patients compared to males, which corresponds to the results reported in several other studies. Indeed, several studies have confirmed that females demonstrate better dental health attitudes and behavior compared to their male counterparts.^[27,28]

It is also notable that most patients held at least a college degree, which could have positively influenced their awareness of the importance of oral hygiene. This influence is demonstrated by the high percentage of patients with fixed prostheses who use various cleaning aids for their oral care. In addition, this could also explain the fact that almost one-third of patients with fixed prostheses had been in place for more than 10 years.

Dental professionals, represented primarily by dentists and oral hygienists, are supposed to be the main source of information for patients. Thus, they should be aware of their responsibility in educating patients about proper oral hygiene behavior, as patients consider them the most reliable source of information. This essential role of dental professionals necessitates adequate teaching and reinforcement before and after treatment.

The findings of this study demonstrate the importance of providing patients with fixed dental prostheses with clear instructions and information on maintaining optimal oral hygiene. Some authors recommend written and oral instructions for patients receiving prosthetic dental treatment.

Interestingly, patients who believed that they received enough instruction on optimal oral hygiene showed a better commitment to daily oral care. This finding reveals the importance of good communication between dentists and their patients. Furthermore, it has been reported that good communication in dentistry can improve patient outcomes and satisfaction and is associated with a lower risk of patient complaints.^[29,30]

The designed questionnaire may have provided general but not precise information about patients' oral care habits with fixed prostheses. Most of the patients included in this study were highly educated, which may not be an accurate representation of patients with fixed dental prostheses. Other factors that could influence a patient's awareness of optimal oral hygiene, such as socioeconomic status, were not investigated in this study.

Hence, further studies are needed to obtain more information from patients and to investigate other factors that may influence patients' awareness of this subject. In addition, future studies evaluating oral care habits could consider other oral hygiene aids.

CONCLUSION

Most patients with dental prostheses believe they lack instructions about the proper method for optimal oral hygiene. Meanwhile, patients who believed that they had received sufficient instructions regarding optimal oral hygiene from their dentists could show better commitment toward their daily oral care.

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Author's contributions

A.A. conceived the ideas, collected the data, analyzed the data, and wrote the manuscript.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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