

Evaluation of Denture care and Denture hygiene habits of patients using removable partial denture seen in a Tertiary dental centre, Ikeja, Lagos State Nigeria

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Abstract

Introduction: Tooth loss demands the use of removable partial denture(RPD) to improve aesthetics, functional and psychological problems. The denture must be well designed and fabricated to benefit patients for a long time. The study aims to evaluate the relationship of denture care, denture hygiene habits and practices among denture wearers.

Methodology: The study was a cross-sectional survey carried out in the Prosthodontic department of a tertiary hospital. Sample population selection involved the use of convenience sampling method. Self-administered questionnaire was used for the participants. The denture hygiene was assessed by ranking using good, fair and poor categories. The data was collected and analyzed using descriptive statistics. The level of significance was set at <0.05 .

Result: The denture cleanliness was good in 58(60.4%) of the participants and moderate in 38(39.6%). Most of the participants 80(83.3%) were given instructions on the cleanliness of their denture. The frequency of cleaning the denture was once daily in 69(71.9%), and twice daily in 20(20.8%) of the participants. The method of cleaning their dentures varied from toothbrush and paste 54(56.2%), toothbrush and mild soap 28(29.2%), and denture cleaning tablets 8(8.3%).

Conclusion: In this study, none of the participants had poor prosthesis cleanliness. Most individuals used a toothbrush and toothpaste to clean their device, although combining mechanical and chemical cleaning is typically reported to be the optimal method. Patients' education and motivation are crucial for successful denture maintenance. It is very important to provide enough information and give instructions on the maintenance and storage of their dentures.

Keywords: Evaluation; Denture care; Denture hygiene habits; RPD

1. Introduction

Tooth loss is a public health interest which was known to be caused by some conditions which include the common periodontitis and caries seen globally.¹ The loss of tooth affects aesthetics, functionality and speech activity.² Tooth loss and its associated factors can adversely affect quality of life.^{3 4 5 6}

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Tooth loss leads to increased use of partial dentures contrast to complete denture which recorded a decline.⁷ Missing teeth are replaced through various replacement treatment options including fixed partial, removable partial dentures(RPDs) or implant retained/supported prosthesis.⁸ Each of these treatment options have their advantages and disadvantages.⁹

The dental practitioners must have good knowledge of the diagnosis and treatment plan in relation to the design and fabrication of RPDs.¹⁰ Dental prosthesis should support both the oral soft and hard tissues without any injuries.¹¹ Properly designed and fabricated dentures should take into consideration the anatomic, physiological, and psychological needs of the patient.¹² and should benefit patients for long time.

Failure to comply with healthy denture hygiene practice can lead to the formation of plaque on dentures which provide a thriving environment for pathogenic organisms. These organisms cause damage to oral tissue directly or indirectly through metabolic by-products and exotoxins in the deposits.^{13 14} Dental plaque can also become calcified if not removed thoroughly and regularly to form calculus which can readily be stained by tobacco, tea, coffee and certain medications.¹⁵ This causes aesthetic compromise and offensive odour from the denture.¹⁶

Major approaches that are recommended for the removal of debris from dentures include mechanical, chemical, or a combination of these methods.¹⁶ Mechanical method involves the use of denture brush, toothbrush or shoe-brush with soft or toilet soap for the cleaning of the denture at least twice daily.¹⁶

The dental practitioner, when fitting the removable partial denture, should instruct patients about its proper use, especially when they do it for the first time in their lives.¹⁷ Important information concerns the necessity to take out of the mouth the RPDs for at least 6-8 hours per day and store them in a dry environment.¹⁸ The person wearing the RPD should keep to the designated check-ups, and not just in case of discomfort associated with its use, or sudden events such as fracture/cracking of RPDs.^{19 20} Also for adjustment and replacement of unfit dentures. This is to prevent damage to oral tissue by ill-fitting denture.²¹

Another important aspect of denture care is avoidance of wearing dentures at night. So many studies^{20 22 23} have shown that denture wearers have the habit of wearing denture overnight.

Despite the fact that removable partial denture is the most common method of replacing missing teeth in Nigeria, there appears to be limited literature on denture care practice by denture wearers.^{8 24 25 26 27}

This study aims to evaluate the denture care and relationship with denture hygiene habits and practices among patients using removable partial dentures seen in a tertiary dental centre in Lagos, Nigeria.

2. Methodology

The study was a cross-sectional survey carried out in the Prosthodontic department of a tertiary hospital. The convenience sampling was used to select the sample population.

Approval for this study was obtained from the Ethical committee of the Lagos State University Teaching Hospital, Ikeja, Lagos State Nigeria.

- **Inclusion criteria** Participants were those who wear acrylic partial dentures, all Kennedy classifications with or without modifications. Those with single arch or both arches. Those that were mentally and physically healthy patients and consented to participate in this study.
- **Exclusion criteria** Participants were patients with missing teeth and no replacement with dentures, and dentate individuals. Those who were mentally and physically compromised, had chronic debilitating diseases or systemic conditions, had speech impairment or did not consent.

The participants were informed about the research work and gave their consent.

The questionnaire was self-administered through which data was collected. The personal information of the participants was collected including age, gender, level of education and ethnicity. Previous history of tooth loss and causes, replacement with dentures, location of dentures, denture age, duration of wearing dentures, dental visit regularity, denture comfort, denture instructions, denture hygiene and maintenance were recorded

The level of prosthesis hygiene was assessed using the Budtz-Jorgensen & Bertram Method²⁸ ranked in categories, namely,

- Good (no plaque or calculus),
- Fair (plaque or calculus covering less than one-third of the prosthesis), or
- Poor (plaque and calculus covering one-third or more of the prosthesis)

2.1. Data analysis

Statistical analysis was performed using SPSS 26(Chicago). Descriptive analysis was measured in number(frequency) and percentage (%), the Chi square and Fisher's exact were used to measure the relationship between the categorical variables. The level of significance for the tests was set at <0.05.

3. Results

Table 1 Socio-demographic factors of the participants

Variables	Frequency	Percentage
Age (years)		
< 20	6	6.2
21-30	10	10.4
31-40	10	10.4
41-50	11	11.5
51-60	19	19.8
61-70	23	24.0
>71	17	17.7
Total	96	100
Gender		
Female	51	53.1
Male	45	46.9
Total	96	100
Educational level		
Uneducated	2	2.1
Primary	9	9.4
Secondary	21	21.9
Tertiary	49	51.0
Postgraduate	15	15.6
Total	96	100
Ethnicity		
Yoruba	70	73.0
Ibos	13	13.5
Others	13	13.5
Total	96	100

In the study, out of the 96 participants, 51 (53.1%) were females and 45(46.9%) were males. Those with tertiary education were 49(51.0%), 21(21.9%) had secondary and 9(9.4%) primary education respectively. Table 1

Table 2 Denture factors in relation to the care of RPD for participants

Variables	Frequency	Percentage
Denture Arch		
Upper	43	44.8
Lower	16	16.7
Both	37	38.5
Total	96	100
Duration of wearing denture		
0-5 yrs	60	62.5
6-10yrs	10	10.4
>11 yrs	26	27.1
Total	96	100
Dental visit		
6- 12 months	10	10.4
Occasionally	52	54.2
When in pain	27	28.1
Never	7	7.3
Total	96	100
Number of dentures made over the years		
1	54	56.3
2	20	20.8
3	14	14.6
> 3	8	8.3
Total	96	100
Have you received instructions on how to clean RPD		
Yes	80	83.3
No	16	16.7
Total	96	100
Form of instructions given		
Verbal	68	85.0
Written	2	2.5
Both	10	12.5
Total	80	100
Frequency of denture(s) cleaning		
Once	69	71.9
Twice	20	20.8

Three times	3	3.1
Others	4	4.2
Total	96	100
Item used to clean denture(s)		
Toothbrush and paste	54	56.2
Toothbrush and mild soap	28	29.2
Denture cleaning tablets	8	8.3
Hand Water alone	4	4.2
Salt and water	1	1.1
Toothbrush and water	1	1.1
Total	96	100
Removal of denture at night		
Yes	55	57.3
No	41	42.7
Total	96	100
Reason for not removing denture		
Aesthetics	4	4.2
Comfortable	9	9.4
Difficult to remove due to pain	1	1.0
Forgetfulness	1	1.0
Ignorance	7	17.9
No reason	19	48.7
Total	41	100

The number of years following denture replacement in this study were less than 1 year 54(54.5%), 2 years 20(20.8%). Most of the participants 80(83.3%) were given instructions on the cleanliness of their denture. The frequency of cleaning the denture was once daily 69(71.9%), twice daily 20(20.8%). The method of cleaning their dentures varied from toothbrush and paste 54(56.2%), toothbrush and mild soap 28(29.2%) and denture cleaning tablets 8(8.3%).

Non removal dentures at night was 41(42.7%) among the participants. The reason for not removing their dentures at night varied from ignorance 7(17.9%), comfortable 9(9.7%) to forgetfulness 1(1.0%). Table 2

Table 3 Association between different variables with Prosthetic cleanliness for removable partial denture

Variable	Category	Prosthesis cleanliness (Denture Hygiene)					
		Good frequency	%	Fair frequency	%	P-Value	
Age	<20	4	7.0	2	5.3	0.923	
	21-30	7	12.0	3	7.9		
	31-40	6	10.3	4	10.5		
	41-50	6	10.3	5	13.2		
	51- 60	11	19.0	8	21.1		

	61-70	12	20.7	11	29.0	
	>71	12	20.7	5	13.2	
	Total	58	100	38	100	
Education	Uneducated	2	3.5	0	0.0	0.421
	Primary	3	5.2	6	15.8	
	Secondary	14	24.1	7	18.4	
	Tertiary	30	51.7	19	50.0	
	Postgraduate	9	15.5	6	15.8	
	Total	58	100	38	100	
Duration of wear of prosthesis	0-5yrs	31	53.4	20	53.0	0.470
	6-10yrs	7	12.1	8	21.0	
	> 11yrs	20	34.5	10	26.3	
	Total	58	100	38	100	
Instructions for prosthetic cleaning	Yes	51	88.0	29	76.3	0.166
	No	7	12.1	9	23.7	
	Total	58	100	38	100	
Method of cleaning prosthesis	Toothpaste	34	57.0	20	52.6	0.453
	Denture cleaning tablets	6	10.3	2	5.3	
	Others	18	31.0	16	42.1	
	Total	58	100	38	100	
How often do you clean your denture daily	Once	39	67.2	30	79.0	0.70
	Twice	14	24.1	6	15.8	
	Thrice	2	3.5	1	2.6	
	Others	3	5.2	1	2.6	
	Total	58	100	38	100	
In what form of instructions given	Verbal	43	74.1	25	65.8	0.879
	Written	2	3.5	0	0.0	
	Both	6	10.3	4	10.5	
	None	7	12.1	9	23.7	
	Total	58	100	38	100	
Do you remove your denture at night	Yes	35	60.3	20	52.6	0.529
	No	23	39.7	18	47.4	
	Total	58	100	38	100	

Out of the total number of participants, age groups 51-60 years old 11(19.0%), 61-70 and greater than 71 years old 12(20.7%) were found with good denture hygiene. Similarly, age groups 51-60 years 8(21.1%), 61-70 years old 11(29.0) % were captured with fair denture hygiene.

Majority of the participants 51(88.8%), 34(57.0%) were aware of how to keep their prosthesis clean and they complied well with the denture instructions given to achieve good denture hygiene. In the frequency of denture cleaning, majority of the participants 39(67.9%) brushed their dentures once, and achieved good denture hygiene likewise 30(79.0%) for fair denture hygiene. Verbal instructions dominated 43(74.1%) for good denture hygiene and same for fair denture hygiene 25(65.8%). With regards to removal of their dentures at night, majority of the participants 35(60.3%) and 20(52.6%) removed their dentures and achieved good and fair denture hygiene respectively. Table 3

4. Discussion

Good denture hygiene is important in achieving overall physical and emotional wellbeing of life.

The participants' previous denture experiences were similar to that from the study of Algabri et al.,²⁹ more than half of the participants had their current dentures as their initial denture, while 20(20.8%) had worn two dentures.

In our study, 80(83.3%) of the participants were informed by their dentists about denture cleaning. In the study of Cankaya et al.,³⁰ and Kalyoncuoğlu et al.,³¹ 91.1%, and 89.0% of the participants were informed about denture cleaning. Another study conducted Ferruzzi et al.,³² discovered that 70.0% of the participants received verbal instructions, this was in accordance with 68(85.0%) from our study.

Common methods of denture cleaning in this study included the use of toothbrush and toothpaste 54(56.2%), and toothbrush and soap water 28 (29.2%). This was different from the study of Kalyoncuoğlu et al.,³¹ where the use of toothbrush and soap was more common with 96 (47.5%) followed by toothbrush and paste 48 (23.8%).

Only 8(8.3%) of the participants reported using denture cleansers, which was significantly lower than 41.9% as reported in another study¹ This could be related to potential insufficient guidance from dentists, the higher cost associated with denture cleansers, and the limited availability of these products in the market.²⁹

Dentifrices and toothpowder may cause surface roughness and damage acrylic dentures. Despite the fact that mechanical cleaning is the most popular and efficient way, chemical cleansers such as soap, tablets, and mouthwashes are also employed as a supplement. Brushing with soap and water has been reported as an effective and convenient way to clean acrylic dentures. However, specific denture cleansers have reported the highest efficacy in the literature.²⁹

This study found that 41(42.7%) of participants slept with their dentures in their mouths similar to other studies with 43.3% and 44.3%.^{26,29} This percentage is lower than those reported from Iran (55.1%).³³, but higher than those reported in India (13.2%)³⁴, Nigeria, (20.2%)³⁵ and Tanzania with (36.0%).³⁶ Reasons for this could include poor knowledge, and beliefs that removing dentures may cause facial muscles to shrink.³⁶ However, wearing dentures day and night can increase the risk of infections and oral health problems, such as denture stomatitis and gum sores.³⁶

Dentures should be removed at night to reduce the risks of prolonged denture use.³⁶ The benefit of nighttime removal includes prevention of complications, maintenance of good denture, oral hygiene and overall health.³⁶

Dentists, especially prosthodontists, should educate patients on how to wear their denture, about denture hygiene, its maintenance, recall visits, and precautions.³³

With regards to dental visits, it was found that a lower percentage 7(7.3%) did not visit a dental clinic which is almost close to another study¹ with 15.3% participants. This finding may be the lack of awareness regarding the importance of dental appointments, or the inadequate instructions received during the denture delivery stage.³³

Looking at the location of denture in the arch, it appeared that more tooth replacement with denture is commonly seen in the upper arch 43(44.8%) than in the lower arch 16(16.7%). This was similarly in another study.³⁷

Most participants had good denture hygiene 58(60.4%) and moderate 38(39.6%) denture hygiene. Similar to the 68(68.0%) with good denture hygiene in the study of Mohd et al.,³⁸ but in contrast to study of Cankaya et al.,³⁰ 144(26.0%) had good denture hygiene.

In our study, there was no significant association between age and prosthesis cleanliness, the elderly were able to maintain good denture hygiene. This contrasts with the study of Basnyat et al.,³⁹ who reported that as the age of patients increases, the level of cleanliness is found to have decreased. Most of the study participants belonged to a high education level and had kept their prosthesis clean perhaps due to their education. This is not in line with the study of Basnyat et al.,³⁹

Moreover, it was revealed that most 39(67.2%) of the respondents who cleaned their dentures once daily, were able to maintain their dental hygiene. This agrees with the report from the study of Mohd et al.,³⁸ On the other hand, 14(24.1%) of the respondents, who cleaned their prostheses twice daily, were blessed with good denture hygiene. In accordance with study done by Nevalainen et al.,⁴⁰ who stated that cleanliness does not depend on the frequency of usages but follow correct technique and information on cleaning.³⁸

Six (10.3%) of the participants, who received both verbal and written instructions, exhibited good denture hygiene. This contrasts with the 70(53.0%) of the participants from an earlier study,³⁸ who received both and had better denture cleaning in comparison with the participants that were provided with only verbal instructions.

To attain optimal denture hygiene, a combination of both verbal and written instructions³⁸ would be very effective compared to written or verbal instructions alone.

5. Conclusion

In this study, none of the participants had poor prosthesis cleanliness. Most individuals used a toothbrush and toothpaste to clean their device, although combining mechanical and chemical cleaning is typically reported to be the optimal method.

The cleanliness of the denture is dependent on advice and oral health habits rather than factors such as smoking, overnight use or the age of the patients. Patients' education and motivation are crucial for successful denture maintenance. It is very important to provide enough information and give instructions on the maintenance and storage of their dentures.

Compliance with ethical standards

Acknowledgments

All individuals who participated in the study

Disclosure of conflict of interest

No conflict of interest disclosed among the authors.

Statement of ethical approval

Clearance was obtained from the Ethical committee of the Lagos State University Teaching Hospital, Ikeja, Lagos State. Nigeria.

Statement of informed consent

Informed consent was obtained from all individual participants involved in the study.

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