

Comparing the Periodontal Health of Male Denture Wearers with their Female Counterpart

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Abstract

Periodontal disease is characterized by the destruction of connective tissue and dental bone support following an inflammatory host response secondary to infection by periodontal bacteria. It is dependent on many factors, such as the microbial challenge, genetic risk factors, environmental and acquired risk factors. The provision of Removable Partial Denture (RPD) for partially edentulous patients helps to restore form, function and aesthetic; more so it also help to maintain the health of the remaining dentition and surrounding oral tissue. They are also more economical, esthetic and easier to clean. The use of RPD has been implicated in the development of periodontal diseases acting as a risk factor. It increases plaque accumulation in the mouth and this result in pathogenesis of periodontal diseases which can result in tooth loss.

Keywords: Periodontal; Health; Counterpart; Denture wearers; Oral tissue

Introduction

Denture wearers are likely to be more female as studies have shown that females attend dental clinics and seek treatment than their males. In addition, they are more concerned about their dental aesthetics and expressed such desires by seeking treatment. Although some studies have reported that females have better oral hygiene and decrease periodontal disease index when compared with their male counterpart, there appears to be a dearth of information on the association between oral hygiene and gender among denture wearers. This study therefore aims to determine the effect of gender on oral hygiene and periodontal disease index of RPD wearers [1].

This was a prospective study carried out at the Prosthetic unit of the Department of Restorative Dentistry, University of Benin Teaching Hospital, Benin City; for duration of one year. The study population consisted of partially edentulous patients randomized into two groups (Group A and B) by use of computer generated numbers for treatment with RPDs. Group A consisted of partially edentulous male patients scheduled for treatment with RPD while Group B consisted of female patients. Centrifugal casting technique using Chrome cobalt alloy was used to fabricate metal base removable partial denture while compression moulding technique was used to fabricate the acrylic base of dentures in both groups [2].

Materials and Methods

The study protocol was approved by the university of Benin teaching hospital health research ethics committee and carried out in accordance with the ethical standards outlined in the Helsinki declaration 1975, as revised in 2013 [3]. Participants were informed about the procedure and written consent was obtained before the study commenced. Inclusion criteria for both groups were consenting partially edentulous patients who presented at the clinic requesting for RPD treatment for missing teeth, had satisfactory oral hygiene with Basic Periodontal Index (BPE) of score zero, with complete opposing dentition but without supra eruption and without underlying systemic diseases that could affect the periodontium or neuromuscular coordination, while the exclusion criteria were patients with TMJ disorder, systemic disease, parafunctional habits and psychological disorder [4]. Patients that refuse to give consent were also excluded from the study. Each patient's medical and dental history was thoroughly evaluated followed by a clinical examination of the periodontium by the periodontist. A diagnostic model to check for malocclusion and arrangement of teeth was done for each patient [5].

A sample size of 14 patients per group was calculated using the formula:

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$$n = \frac{2z^2pq}{d}$$

Z=The standard normal deviate, usually set at 1.96 which correspond to the 95% confidence level

p=This was based on a prevalence of 1.8% on a previous study

q=1.0-p

d=An observed difference of 0.1 which is considered significant at the 0.05 level

RPD fabricated for all patience was classified using the Kennedy method of classification of removable partial denture:

- Class I: Bilateral free end saddle.
- Class II: Unilateral free end saddle.
- Class III: Posteriorly bounded unilateral saddle that has not crossed the midline.
- Class IV: Posteriorly bounded bilateral saddle that has crossed the midline.

RPI system of denture design was used for free end saddles while lingual bar and U-shaped major connector were used for mandibular and maxillary major connector respectively. The abutment teeth were those in contact with RPD while other teeth in the mouth were non-abutment [6,7]. The plaque index and periodontal status of all the standing teeth in the mouth were examined by a periodontist at baseline, 1 month, 3 months and 6 months post insertion using the following periodontal parameters: Plaque Index (PI) by Silness and Loe (1964) and Periodontal disease index [8].

Patience compliance with post insertion instructions and oral hygiene maintenance was satisfactory as the print out of these instructions was given to patience and weekly contacts were made to check on their compliance level. There was no complaint of denture usage from any of the participants hence there was no need for adjustment of any of the denture after insertion [9]. Data collected was analysed using statistical product and service solutions version 21 for window. Descriptive statistics in form of frequencies, percentages and mean were used to appraise the data while *Chi-square* statistics was used to determine the degree of association between periodontal disease index scores. The T-test analysis was used to compare the mean plaque index. The level of statistical significance was set at $p < 0.05$ [10].

Results

A total of 28 patients who met the inclusion criteria participated in this study, (fourteen male patients in group A and fourteen female patients in group B with male to female ratio of 1:1) [11]. Seven patients received metal base removable partial denture while the other seven received acrylic base removable partial denture in each group. The age range of the study participants was 24 to 60 years with a mean age of 40.2 ± 11.35 years, age 39 years (53.5%) and below were more as participants, most of the participants (39.3%) were skill workers, the upper arch (53.6%) had more RPD while (50.0%) had secondary and tertiary level of education (Table 1).

Table 1: Socio-demographic characteristics of the patients.

Variables	Gender		Total n (%)
	Male group (n=10) n (%)	Female group (n=10) n (%)	
	Denture type		
MBRPD	7 (50.0)	7 (50.0)	14 (50.0)
ABRPD	7 (50.0)	7 (50.0)	14 (50.0)
	Age (years)		
20-29	3 (21.4)	5 (35.7)	8 (28.5)
30-39	4 (28.6)	3 (21.4)	7 (25.0)
40-49	4 (28.6)	2 (14.3)	6 (21.5)
50-60	3 (21.4)	4 (28.6)	7 (25.0)
	Occupation		
Unemployed	2 (14.3)	2 (14.3)	4 (14.3)
Unskilled	6 (42.8)	3 (21.4)	9 (32.1)
Semi-skilled	2 (14.3)	2 (14.3)	4 (14.3)
Skilled	4 (28.6)	7 (50.0)	11 (39.3)

	Male (n, %)	Female (n, %)	P-value
Professional	0 (00.0)	0 (00.0)	0 (00.0)
Arch			
Upper	8 (57.1)	7 (50.0)	15 (53.6)
Lower	6 (42.9)	7 (50.0)	13 (46.4)
Level of education			
Informal	2 (14.3)	7 (50.0)	9 (32.1)
Primary	4 (28.6)	1 (7.1)	5 (17.9)
Secondary	4 (28.6)	4 (28.6)	8 (28.6)
Tertiary	4 (28.6)	2 (14.3)	6 (21.4)

There was a progressive increase in accumulation of plaque in both groups as the duration of denture use increases from 1 to 6 months post insertion. Although the female group had higher plaque scores compared with the males but there was no significant difference between both groups at 1 month

(p=0.8680), 3 months (p=0.714) and 6 months (p=0.632) post insertion (Table 2).

Table 2: Comparison of mean plaque scores of male patients with female patients.

Time of evaluation	Gender		P-value
	Male (mean ± SD)	Female (mean ± SD)	
Baseline	0.95 ± 0.21	0.87 ± 0.24	0.08
1 month	1.05 ± 0.28	1.07 ± 0.37	0.868
3 months	1.65 ± 0.34	1.70 ± 0.59	0.714
6 months	1.55 ± 0.35	1.68 ± 0.24	0.362

More so, the periodontal disease was worse in the female group when compare with the males 1 to 6 months post insertion as more female patients had a periodontal disease index score of 2 and 3 at 3 months than the males (Table 3). At 6 months, though the male group had a higher number of periodontal disease index scores of 2 but the female had a higher number of score 3. More so there was no statistical

significant difference of the periodontal disease between the two groups at 1 month, 3 months (p=0.290) and 6 months (p=0.212) post insertion.

Table 3: Comparison of Periodontal Disease Index (PDI) between male and female group.

Time of evaluation/PDI scores	Gender		P-value
	Male frequency (%)	Female frequency (%)	
Baseline			
0	10 (100.0)	10 (100.0)	*
1	0 (0.0)	0 (0.0)	
2	0 (0.0)	0 (0.0)	
3	0 (0.0)	0 (0.0)	
4	0 (0.0)	0 (0.0)	
1 month			
0	10 (100.0)	10 (100.0)	*
1	0 (0.0)	0 (0.0)	
2	0 (0.0)	0 (0.0)	
3	0 (0.0)	0 (0.0)	

4	0 (0.0)	0 (0.0)	
3 months			
0	0 (00.0)	1 (10.0)	0.29
1	6(60.0)	2 (20.0)	
2	4(40.0)	6 (60.0)	
3	0 (0.0)	1 (0.0)	
4	0 (0.0)	0 (0.0)	
6 months			
0	0 (0.0)	0 (0.0)	0.212
1	1 (10.0)	3 (30.0)	
2	7 (70.0)	4 (40.0)	
3	2(20.0)	3 (30.0)	
4	0 (00.0)	0 (00.0)	

Note: *No statistics was computed because both variables were constant

Discussion

The use of RPD is a cost effective way of replacing missing teeth in the mouth, but its use has been implicated in the pathogenesis of periodontal diseases, and most patients who use RPD's present with signs of periodontal disease [12]. It is therefore imperative that the oral hygiene and periodontal health of all the standing teeth in the mouth of the patients who requested for RPD are properly examined so that their periodontal health is not compromised as a result of using removable partial denture. The age range of the patients (24-60 years) in this study was in agreement with previous studies which showed that periodontal disease and dental caries is prevalent within this age group [13]. Majority of the study participants were of the low social economic class, patients in this class opted for tooth extraction because they are unable to afford tooth restoration hence they are more among RPD seekers.

This study showed that there was no significant difference between the mean plaque score of the male patients and their female counterpart from one month to six months post insertion but the mean plaque score of the female patients were higher than their male counterpart. This finding can only be substantiated by the fact that the male patients maintained a better oral hygiene than the female patients as it has been reported that proper maintenance of oral hygiene by RPD wearers reduce plaque accumulation.

Though studies have showed that females are more meticulous in maintaining oral hygiene, findings from this study suggested the contrary. More so, the social economic class of the female was higher than their males, this did not reflect in an improved oral hygiene as the female had higher mean plaque score compared to their male counterpart as a result of poor oral hygiene maintenance [14]. It can therefore be deduced from this study that with proper patient's selection,

adherence to post insertion instructions and maintenance of good oral hygiene, RPD patients will have less plaque accumulation and hence less periodontal disease.

There was no significant difference between the periodontal disease observed in both male and female groups one to six months post insertion, although the periodontal disease of the female group was worse than that of the male group as more females have higher periodontal disease index scores than their male counterpart at the end of three and six months post insertion [15]. These could be attributed to increased plaque accumulation in the female group as increase in periodontal disease among denture wearers has been reported to be associated with increased plaque accumulation.

Conclusion

As earlier mentioned, there is a dearth of information concerning this subject; however findings from this study support the fact that use of RPD which predisposes its wearers to periodontal disease except oral hygiene is maintained can result to further tooth loss and edentulousness especially in women with poorer oral hygiene. In addition this study showed that males are more motivated to maintaining oral hygiene than the females. This could be the reason why younger women become edentulous earlier than their male counterpart as reported in some studies. Furthermore it has been reported also that the prevalence of denture stomatitis which is associated with plaque accumulation as a result of poor oral hygiene among denture wearers are more in the female denture wearers than the males. There is no doubt that improved oral hygiene among denture wearers as a result of adherence to post insertion instructions help to reduce post insertion complications that may arise from denture use. The female RPD wearers had higher plaque index and periodontal diseases when compared to the males.

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