

Original ARTICLE

A Retrospective study of periodontal health of Abutment teeth supporting Removable Partial dentures

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ABSTRACT

Background: Removable partial dentures (RPD) have an important role in the health of periodontium. Some patients are unable to afford treatment with implants either anatomical or economic reasons, therefore RPD can be considered a simple, noninvasive, and relatively cheap treatment option for the shortened dental arch. **Aim of the study:** To study periodontal health of Abutment teeth supporting Removable Partial dentures. **Materials and methods:** The present study was conducted by joint effort of Department of Prosthodontics and Department of Pedodontics of the Dental institution. For the study, we selected patients that received RPD from the institute clinic. They were contacted and invited to participate in the study. The duration for which the patient was wearing the removable denture following placement varied from 1 year to 7 years. For the reduction of observational error, the task of measurements was given to a single examiner. A total of 50 patients participated in the study. A written consent was obtained from the participants after explaining to them the procedure and advantages of study. The design of the denture and classification for ridge according to Kennedy's classification (from Class I to Class IV) were recorded and noted for further evaluation. **Results:** A total of 50 patients participated in the present study. 42 patients were male and 8 patients were females. The number of removable Partial dentures examined was 70 RPDs. Based on the design of RPD, 51 RPDs were clasp retained and 19 RPDs were with attachments. We observed that Grade 0 mobility was present in majority of abutment teeth (n=42), out of which 28 teeth were with clasp retained RPDs and 14 teeth were with attachments. Grade 1 mobility was present in 18 patients, 14 were clasp retained and 4 were with attachments. Grade 2, 3 and 4 mobility was absent in patients with attachment RPDs. **Conclusion:** From the results of present study, we conclude that the periodontal health of clasp retained abutment teeth is more compromised as compared to attachment RPDs.

Keywords: Abutment, RPD, periodontal health

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INTRODUCTION

Removable partial dentures (RPD) have an important role in the health of periodontium. Glickman in 1948 reported that from periodontal viewpoint, fixed prostheses are most suitable for replacement of missing teeth, but there are certain clinical situations where RPD are the only possible way to restore the function of teeth, as is the case of Kennedy class I and II. Some patients are unable to afford treatment with implants either anatomical or economic reasons, therefore RPD can be considered a simple, noninvasive, and relatively cheap treatment option for the shortened dental arch.^{1,2} The main reason for the failure of RPD is the loss of abutment teeth due to periodontal changes and caries.^{3,4} Longitudinal studies of RPDs manifested

with gingivitis, periodontitis and mobility of abutment teeth. RPDs can increase the incidence of caries; damage the periodontium, relatively large amounts of plaque and the amount of stress on natural teeth. These changes occur due to poor oral hygiene, increased plaque and calculus accumulation.^{5,6} Hence, the present study was conducted to study periodontal health of Abutment teeth supporting Removable Partial dentures.

MATERIALS AND METHODS

The present study was conducted by joint effort of Department of Prosthodontics and Department of Pedodontics of the Dental institution. The ethical clearance for the protocol of study was obtained from the ethical committee of the dental institution prior

to commencement of study. For the study, we selected patients that received RPD from the institute clinic. They were contacted and invited to participate in the study. The duration for which the patient was wearing the removable denture following placement varied from 1 year to 7 years. For the reduction of observational error, the task of measurements was given to a single examiner. A total of 50 patients participated in the study. A written consent was obtained from the participants after explaining to them the procedure and advantages of study. The design of the denture and classification for ridge according to Kennedy's classification (from Class I to Class IV) were recorded and noted for further evaluation. For the assessment of the abutment teeth, we recorded plaque index; calculus index; bleeding on probing (BOP); probing depth (PD); gingival recession (GR); and tooth mobility (TM). Plaque index was recorded according to Silness/ Loe Index, 1964. Calculus Index (CI) was recorded according to Green-Vermilion Index, 1964. Bleeding on probing (BOP) was recorded according to Ainamo & Bay, 1975. The measurement of probing depth was done using William's probe, from crest of the gingival margin to depth of pocket. Based on the measurement, PD was graded ranging from 0-3. 0 signifies normal PD (≤ 2 mm); 1 signifies PD=2-3 mm; 2 signifies PD= 3-5 mm; 3 signifies P<5 mm. GR was measured as absent or present. The recording of tooth mobility was done according to Miller (grade 0-3). Grade 0 signifies no mobility; grade 1 signifies 1mm in horizontal; grade 2 signifies >1 mm in horizontal direction; and grade 3 signifies mobility in apical direction.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

RESULTS

A total of 50 patients participated in the present study. 42 patients were male and 28 patients were females. The number of removable Partial dentures examined was 70 RPDs. Based on the design of RPD, 51 RPDs were clasp retained and 19 RPDs were with attachments. **Table 1** shows the tooth mobility based on RPD design. We observed that Grade 0 mobility was present in majority of abutment teeth (n=42), out of which 28 teeth were with clasp retained RPDs and 14 teeth were with attachments. Grade 1 mobility was present in 18 patients, 14 were clasp retained and 4 were with attachments. Grade 2, 3 and 4 mobility was absent in patients with attachment RPDs. The difference was statistically significant with p value less than 0.05 (**Fig 1**). **Table 2** shows the gingival recession based on RPD design. We observed that gingival recession was present in 46 abutment teeth out of 70. 34 teeth were with clasp retained RPDs and 12 teeth with attachment RPDs. Gingival recession was absent 24 abutment teeth out of which 16 were clasp retained and 8 with attachment. The difference was statistically significant with p value less than 0.05.

DISCUSSION

The present study was conducted to assess the periodontal health of abutment teeth of Removable partial dentures. We observed that majority of abutment teeth had grade 1 mobility and gingival recession was present in these teeth. The clasp retained abutment teeth had significantly compromised periodontal health as compared to attachment RPDs. The periodontal health is evident from the gingival recession and teeth mobility. The results are consistent with other studies conducted by some authors.

Table 1: Tooth mobility grade based on RPD design

Grade of Tooth mobility	RPD Design		TOTAL	p-value
	Clasps	Attachments		
0	28	14	42	0.01
1	14	4	18	
2	5	1	6	
3	2	-	2	
4	2	-	2	
TOTAL	51	19	70	

Fig 1: Showing tooth mobility grade based on RPD design

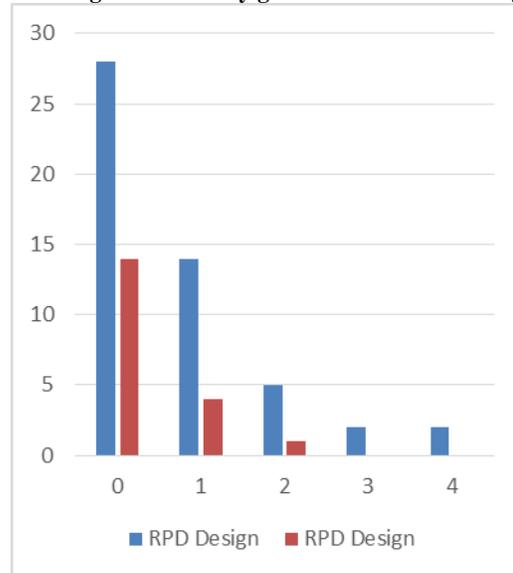


Table 2: Gingival Recession based on RPD design

Gingival Recession	RPD Design		Total	p-value
	Clasps	Attachments		
Yes	34	12	46	0.01
No	16	8	24	
TOTAL	50	20	70	

Sadek SA et al evaluated three different Removable Partial Denture (RPD) types restoring mandibular class II modification I edentulous cases with regards to patient's satisfaction and abutments survival. Forty-two partially edentulous patients were divided into three groups (Group I rehabilitated with Vitallium RPD, Group II rehabilitated with Vitallium RPD where the modification area restored with the surveyed bridge, Group III rehabilitated with Thermopress RPD). The patients were followed up for twenty-four months. Using a questionnaire, prosthodontic maintenance required was documented at the delivery and after 3 months. There was a significant difference regarding patient satisfaction for group III while for groups I and II there was a non-significant difference. Regarding the survival rate, there was a non-significant difference between the three groups at the end of twenty-four months of follow up. Patient satisfaction and abutment survival were better with Thermopress RPD than conventional Vitallium RPD or Vitallium RPD with a surveyed bridge restoring the modification area. Although a non-statistically significant difference was found in the survival rate of abutments between groups, a clinically important result was

revealed as no abutments failures were reported in the Thermopress group. Jorge JH et al evaluated the degree of mobility of abutment teeth of distal extension and tooth supported removable partial dentures by using Periotest. Two types of clasp design were selected for evaluation. In cases with unilateral and bilateral distal-extension, a clasp design including a T clasp of Roach retentive arm, a rigid reciprocal arm and a mesial rest were used. For the abutments of tooth-supported removable partial dentures, a second clasp design with a cast circumferential buccal retentive arm, a rigid reciprocal clasp arm and a rest adjacent to the edentulous ridges was selected. A total of 68 abutment teeth was analysed. Periotest values were made at the time of denture placement (control) and at 1, 3 and 6 months after the denture placement. The statistical analysis was performed using Friedman test. All analysis was performed at a 0.05 level of significance. The results revealed that no significant changes in tooth mobility were observed during the 6-months follow-up. In conclusion, their findings suggested that adequate oral hygiene instructions, careful prosthetic treatment planning and regular recall appointments play an important role in preventing changes in abutment tooth mobility caused by removable partial denture placement.^{7,8}

Almeida ML et al evaluated periodontal parameters of abutment teeth and interproximal sites, in patients with mandibular class I Kennedy Removable Partial Dentures (RPD), after 4 years of periodontal treatment. Fourteen patients with periodontal disease were treated and evaluated for the following parameters: plaque index (PI), bleeding on probing (BOP), probing depth (PD), gingival recession (GR), clinical attachment loss (CAL) and keratinized mucosa (KM). Parameters were compared between abutment teeth with direct and indirect retainers at all time-points. Periodontal maintenance was recorded at 6, 18 and 48 months. Data were analyzed using the Friedman and Wilcoxon Tests. Most patients (n=11; 78.6%) included were female and had a mean age of 66 years (\pm 7.8). After 48 months, a significant reduction was only observed in PI for both abutment teeth; in contrast, PD, GR, CAL and KM all increased by the end of the study. BOP increased at 48 months for the abutment teeth with direct retainers. The distal site of the abutment teeth with direct retainers presented higher values for GR and CAL. Non-surgical periodontal therapy was effective during the first 18 months, but periodontal conditions were worse at 48 months after therapy. The distal sites of abutment teeth with direct retainers presented the worst periodontal conditions. Akaltan F et al conducted a 30-month follow-up study on 36 patients to evaluate the effects of the lingual plate as a major connector in distally extended removable partial dentures (RPDs) on tooth stabilization. At the same time, the study evaluated the effects of lingual plate-type RPDs and lingual bar-type RPDs on periodontal health. The most striking finding of the study was that, with the exception of gingival recession (GR), periodontal conditions improved with both types of RPDs. At the end of 30 months, there were significant differences in plaque index, GR and tooth mobility (TM) values between treatment groups. Plaque accumulation was greater in the lingual plate treatment group; however, this did not result in periodontal breakdown. There were no statistically significant differences between treatment groups with respect to pocket

depth, gingival index or attachment loss. Moreover, patients treated with lingual plate-type RPDs demonstrated less TM when compared with patients treated with lingual bar-type RPDs at the end of 30 months follow-up. Overall study findings established that with adequate checks on oral and denture hygiene at regular intervals, patients with RPDs may even experience improved periodontal health. Moreover, the clinical interpretation of decreased TM observed in patients treated with lingual plate-type RPDs may be questionable as the plaque accumulation was greater in the lingual plate treatment group inspite of periodic recalls.^{9,10}

CONCLUSION

Within the limitations of the present study, it can be concluded that the periodontal health of clasp retained abutment teeth is more compromised as compared to attachment RPDs.

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