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Original Article

Clinical Evaluation of Periodontal Health of Abutment Teeth with Removable Partial Dentures Designed with and Without Clasps

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Abstract

Aim: The purpose of the study was to evaluate the effect of removable partial dentures designed with and without clasps on the periodontal health of the abutment teeth over a one-year worn period.

Materials and Methods: A total of 80 subjects wearing RPDs were selected for the study. The subjects were equally divided into 2 groups of 40 subjects each with the age ranging from 51-70 years. Group I consists of 20 males and 20 females wearing removable partial dentures with clasps in their design whereas Group II consists of 20 males and 20 females wearing removable partial dentures without clasps. Abutment teeth of each subject were assessed for plaque index (PI), calculus index (CI), blending on probing (BOP), probing depth (PD), gingival recession (GR), tooth mobility (TM). Level of significance was set at $p<0.05$.

Results: Results showed a highly significant association between bleeding on probing, increased Periodontal probing depth and Gingival recession with the subjects wearing RPDs designed with clasp. The significance was showed using Chi Square test with p value <0.05.

Conclusion: Patients wearing RPDs are at a greater risk of periodontal damage due to lack of ability and poor motivation to maintain proper oral hygiene. RPDs with clasp incorporated in their design leads to more accumulation of plaque in the areas covered by the dentures and below the clasp arms in abutment teeth, which increases gingival inflammation. Therefore, it is mandatory for dental professionals to educate and motivate patients for maintenance of their oral hygiene and periodic follow up.

Key words: Removable partial denture, Clasp, Periodontal health

INTRODUCTION

Removable partial dentures serve as an economical method for partially edentulous patients with good patient acceptability.[1]

Despite of wide acceptability, RPDs with different framework designs such as shape of the denture base, number and position of the clasps and occlusal rests are associated with increased plaque accumulation which leads to periodontal damage the development of caries.[2-14]

There is a particular concern in elderly patients in whom age related gingival recession favors the development of root caries. The etiology of root caries is related to Lactobacillus spp, and it was also found in a previous study that Lactobacillus was present in high numbers in patients wearing RPDs.[15]

Therefore, for a better prognosis and durability of the RPD, it is important to control the accumulation of dental plaque. As investigated by many researchers the effect of regular checkups on oral health and denture hygiene, proper motivation and instructions, all periodontal parameters

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appeared with better results in patients who were going to receive an RPD. [16, 17]

The aim of this study was clinical evaluation of periodontal health of abutment teeth with removable partial dentures designed with and without clasps in a one year worn duration.

MATERIALS AND METHODS

Out of a sample size of 167 subjects coming to the Dental OPD of District Hospital, Kathua, J&K, a total of 80 subjects wearing RPDs were selected for the study based on the inclusion crieteria and willingness of the patients.

Inclusion Crieteria

Partially edentulous patients.
Pateints wearing RPDs from one year.

Exclusion Crieteria

Completely edentulous patients.
Any systemic disease.

The subjects were equally divided into 2 groups of 40 subjects each with the age ranging from 51-70 years. Group I consists of 20 males and 20 females wearing removable partial dentures with clasps in their design whereas Group II consists of 20 males and 20 females wearing removable partial dentures without clasps. Abutment teeth of each subject were assessed for plaque index (PI), calculus index (CI), blending on probing (BOP), probing depth (PD), gingival recession (GR), tooth mobility (TM). Level of significance was set at $p<0.05$.

RESULTS

Table 1 showed the age distribution of the subjects. Table 2 showed a statistically highly significant association between bleeding on probing and removable partial dentures designed with clasps in them. 77.5% of the patients showed bleeding on probing wearing RPDs with clasp ($p=0.0001$).

Table 3 showed a statistically highly significant relationship between RPDs with clasp and increased Periodontal probing depth. 57.5% of the subjects wearing RPDs with clasp showed Periodontal probing depth of 2-3mm followed by 35% of the subjects showing a depth more than 3 mm and 7.5% of the subjects showing a depth of <2 mm ($p=0.0000$).

Table 4 showed a statistically highly significant relationship of Gingival recession with RPDs designed with clasp. 72.5% of the subjects wearing RPDs with clasp showed Gingival recession whereas only 35% of the subjects in the group of patients wearing RPDs without clasp showed Gingival recession ($p=0.0008$).

Table 1: Age distribution among subjects

Age (years)	With clasp		Without clasp	
	Male	Female	Male	Female
51-60 years	10	10	10	10
61-70 years	10	10	10	10
Total	20	20	20	20

Table 2: Bleeding on probing BOP index

RPD type	BOP index		Total (%)
	Yes (%)	No (%)	
With clasp	31 (77.5)	9 (22.5)	40 (100)
Without clasp	13 (32.5)	27 (67.5)	40 (100)

BOP: Blending on probing $\chi^2=16.364$, df=1, $\chi^2/df=16.36$, $P(\chi^2>16.364)=0.0001$

Table 3: Periodontal probing depth

RPD type	Periodontal probing depth (%)			Total (%)
	<2mm	2-3mm	>3mm	
With clasp (n)	3 (7.5)	23 (57.5)	14 (35)	40 (100)
Without clasp (n)	27 (67.5)	7 (17.5)	6 (15)	40 (100)

$\chi^2=30.933$, df=2, $\chi^2/df=15.47$, $P(\chi^2>30.933)=0.0000$

Table 4: Gingival recession

RPD type	Gingival Recession		Total (%)
	Yes (%)	No (%)	
With clasp	29 (72.5)	11 (27.5)	40 (100)
Without clasp	14 (35)	26 (65)	40 (100)

$\chi^2=11.314$, df=1, $\chi^2/df=11.31$, $P(\chi^2>11.314)=0.0008$

DISCUSSION

The strong association between the uses of RPDs, biofilm accumulation, and caries, oral hygiene raised a concern, which should be incorporated into the treatment plan. The present study was conducted in 167 subjects coming to the Dental OPD of District Hospital, Kathua, J&K to find the association of Periodontal Health of Abutment Teeth with Removable Partial Dentures designed with and without clasps.

The findings of our study showed a strong association between the increased incidence of bleeding on probing in patients (77.5%) which is in accordance with the study done by Dula LJ et al.[18] The studies done in the past stated that clasp retained design produced less torque on abutment teeth. wearing RPDs designed with clasp.[19,20] According to various authors an ideal design for RPD is that which

causes minimal stress and less damage to the abutment teeth and associated periodontium. The findings of our study showed a significant relationship between gingival recession and RPDs with clasp. The similar findings were found by studies done by Wright PS and Hellyer PH.[21]

A highly significant association of increase in probing depth was found in subjects with RPDs with clasp which is in accordance with the studies done by Amaral BA and Dula et al.[18,22] The limitations of our study is that various oral hygiene and gingival indices were not taken into consideration, in-depth analysis of grades of gingival recession could have done.

Therefore, it can be suggested that the RPD design should be as simple as possible, so that it causes minimal damage to the periodontium and makes the patient able to maintain his/her oral hygiene properly. Further education and motivation of the patient is compulsory at the time of delivery of prosthetic appliance. Maintenance therapy and regular follow up may be advocated in respective cases.

CONCLUSION

Patients wearing RPDs are at a greater risk of periodontal damage due to lack of ability and poor motivation to maintain proper oral hygiene. RPDs with clasp incorporated in their design leads to more accumulation of plaque in the areas covered by the dentures and below the clasp arms in abutment teeth, which increases gingival inflammation. Therefore, it is mandatory for dental professionals to educate and motivate patients for maintenance of their oral hygiene and periodic follow up.

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