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ANALYSIS OF IMPACT OF REMOVABLE PARTIAL DENTURES ON ABUTMENT TEETH

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Abstract:
Aims and objectives: *The main objective of the study is to analyze the impact of removable partial dentures on abutment teeth.* ***Material and methods:*** *This descriptive study was conducted in Punjab Dental Hospital, Lahore for the period of six month (February 2018 to August 2018). The data was collected from 100 patients of both genders. Abutment teeth used as direct or indirect retainer for the RPD were a study group, while the non-abutment teeth in the same jaw were used as a control group. Periodontal examination was conducted and the following variables were determined: (PLI), (CI), bleeding on probing (BOP), PD and TM. Probing pocket depth (PD) was measured from the crest of the gingival margin to a probable pocket depth using a Williams Probe and read to the nearest millimeters (mm).* ***Results:*** *The data was collected from 100 patients. They were 87 partial dentures with clasp-retained. The selected age range for this study was 33–80 years. The mean scores for PLI, CI, BOP, PD, and TM index, of the abutment teeth and non-abutment teeth were no statistically significant at the time of insertion of RPD and after 1-month, except PLI index were statistically significant 0.57 ± 0.55 for abutment and 0.30 ± 0.46 for non-abutment teeth.* ***Conclusion:*** *It is concluded that lack of oral hygiene and health care management may be the cause of the loss of abutment teeth for elderly patients. With carefully planned prosthetic treatment and adequate maintenance of the oral and denture hygiene, we can prevent the periodontal diseases.*

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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].

One of the most popular methods since 1970 for the replacement of missing teeth was RPD, whereas many dentists consider a prosthetic rehabilitation of the second class. Also according to some studies RPD are not recommended for all patients, especially in patients where teeth mobility had movement is not >1 mm [2]. RPD are generally attached to the abutment natural teeth by clasps or attachments that hold the denture in place. RPD in the mouth has the potential of increase plaque formation on tooth surface in contact with RPD, especially to abutment teeth, to which clasps or attachments are attached [3].

There are adverse effects that should be kept in mind which might affect the remaining teeth specially, the abutments and the supporting tissues. These effects might extend to the muscles of mastication [4]. We should plan a removable partial dentures (RPDs) without damage to the adjacent teeth or the underlying tissues. So this paper will highlight the possible adverse effects of constructing removable partial dentures [5].

The relation between the adverse effects of partial dentures on abutment teeth is generally related to the type of the denture whether it has an acrylic or cobalt-chromium (Co-Cr) base. This is important as the ability of a denture to retain plaque is related to the type of denture base; a Co-Cr denture is more hygienic [6].

Aims and objectives

The main objective of the study is to analyze the impact of removable partial dentures on abutment teeth.

MATERIAL AND METHODS:

This descriptive study was conducted in Punjab Dental Hospital, Lahore for the period of six month (February 2018 to August 2018). The data was collected from 100 patients of both genders. Abutment teeth used as direct or indirect retainer for the RPD were a study group, while the non-abutment teeth in the same jaw were used as a control group. Periodontal examination was conducted and the following variables were determined: (PLI), (CI), bleeding on probing (BOP), PD and TM. Probing pocket depth (PD) was measured from the crest of the gingival margin to a probable pocket depth using a Williams Probe and read to the nearest millimeters (mm). Measurements were made in the fourth surfaces in abutment teeth: Mesial, oral, distal and vestibular surfaces. Scores ranging from 0 to 3 represented the highest PD observed: 0 - Normal probe depth of 2 mm or less; 1 - Probe depth of about 2 mm, but not >3 mm; 2 - Probe depth >3 mm but <5 mm and 3 - Probe depth greater than 5 mm or more. Tooth mobility (TM) was recorded according to Miller 1985 a scale from 0 to 3: 0 - No mobility; 1 - mobility smaller than 1 mm in the horizontal direction; 2 - Mobility >1 mm in the horizontal direction; 3 - mobility in the apical-vertical directions.

Statistical analysis

Statistical analysis was performed using Statistical Package for Social Science 22 for Windows (SPSS Inc., Chicago, Illinoiss, USA). Testing data were done with Mann-Whitney test. Differences were considered significant when $P < 0.05$.

RESULTS:

The data was collected from 100 patients. They were 87 partial dentures with clasp-retained. The selected age range for this study was 33–80 years. The mean scores for PLI, CI, BOP, PD, and TM index, of the abutment teeth and non-abutment teeth were no statistically significant at the time of insertion of RPD and after 1-month, except PLI index were statistically significant 0.57 ± 0.55 for abutment and 0.30 ± 0.46 for non-abutment teeth.

Table 01: Demographic values of selected patients

Gender, *n* (%)	
Female	49 (45.8)
Male	58 (54.2)
Age (years)	
Mean±SD	56.7±11.0
Range	32-80
Residence, *n* (%)	
Urban	88 (82.2)
Rural	19 (17.8)
Education, *n* (%)	
Non	2 (1.9)
Primary	19 (17.8)
Secondary	47 (43.9)
High	39 (36.4)
Heart disease, *n* (%)	
Yes	18 (16.8)
No	89 (83.2)
Diabetes, *n* (%)	
Yes	10 (9.3)
No	97 (90.7)

SD: Standard deviation

After 3 months of wearing of the RPD's, there were significant differences between abutment and non-abutment teeth with regard to the BOP (1.53 ± 0.50 and 1.76 ± 0.43 for abutment and non-abutment teeth respectively), PD (0.28 ± 0.45 and 0.12 ± 0.33 for abutment and non-abutment respectively) and PLI (1.20 ± 0.46 and 0.75 ± 0.64 for abutment and non-abutment respectively). There was found no significant mean difference in TM and CI between the abutment and non-abutment teeth ($P > 0.05$).

Table 02: Clinical characteristics of the sample

	Abutment	Non-Abutment	P
BOP			
Mean±SD	2.00±0.00	2.00±0.00	>0.05
Range	2-2	2-2	
PD			
Mean±SD	0.00±0.00	0.00±0.00	>0.05
Range	0-0	0-0	
TM			
Mean±SD	0.20±0.40	0.19±0.40	0.981
Range	0-1	0-1	
PLI (Silness/Löe)			
Mean±SD	0.07±0.26	0.06±0.24	0.848
Range	0-1	0-1	
CI (Greene Vermilion)			
Mean±SD	0.00±0.00	0.00±0.00	>0.05
Range	0-0	0-0	

DISCUSSION:

Mean scores for BOP, PD, PLI index of the abutment teeth were significantly greater compared to non-abutment teeth after 3 months ($P < 0.001$). This difference can be explained, because 9.3% of patients were with diabetes, 16.8% with heart disease and 37% with RPD's with attachment that affect periodontal changes, while most recent studies have excluded cases with diabetes and heart diseases [7]. High scores of PLI and a maintenance interval longer than 3 months were significant predictors for positive changes in periodontium [8]. Our results agree with Mine K that the microbiological risk for periodontitis of abutment teeth is greater than at non-abutment teeth in RPD's wearers after 6 months that were significant predictors for positive red complex scores ($P < 0.05$). In the pocket depth, there was found no significant mean difference found between the abutment and non-abutment teeth [9].

Yeung *et al.* analyzed a total of 87 patients 5–6 years after placement cobalt–chromium RPD's wearers and concluded there was a high prevalence of gingivitis, plaque, and gingival recession, especially in dentogingival surfaces in close proximity (within 3 mm) to the dentures [10]. Furthermore, according to the author do Amaral BA, PLI values significantly increased after 1-year of RPD's wearing in abutment teeth, comparing with non-abutment teeth. It was also confirmed that PD and GI mean values increased from the initial assessment to 1-year of RPD's [11].

CONCLUSION:

It is concluded that lack of oral hygiene and health care management may be the cause of the loss of abutment teeth for elderly patients. With carefully planned prosthetic treatment and adequate maintenance of the oral and denture hygiene, we can prevent the periodontal diseases.

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