The effect of acrylic removable partial dentures on periodontal health of abutment and non-abutment teeth

Abeer S. Al Rawi B.D.S, M.Sc. (1)

ABSTRACT

Background: Acrylic removable partial denture (ARPD) is a common treatment available for restoration of partially edentulous ridges. Longitudinal studies indicate that ARPDs have been associated with increased gingivitis, periodontitis and abutment mobility. The aim of the present study is to compare the effect of ARPDs on periodontal health of abutment and non-abutment teeth.

Material and method: A total of 30 patients prepared to wear ARPDs participated in this study they were 14 males and 16 females aged 35 to 50 years. Plaque and gingival indices as well as bleeding on probing and probing pocket depth were measured, both on abutment and non-abutment teeth immediately before placement of the partial dentures then 6 & 12 months after placement of the partial dentures.

Results: Significant differences were noticed on plaque and gingival indices plaque index was 1.8 and 0.9 for abutment and non -abutment respectively while gingival index was 1.8 and 0.8 at the end of the study. The percentage of the surfaces of abutment teeth with bleeding on probing was 32% and only 12% for non-abutment teeth at the end of the study. Only 3% of the surfaces of non-abutment teeth denotes a pocket depth of > 4mm and 14% for abutments at the end of the study. Non significant differences were found on bleeding on probing and probing pocket depth between abutment and non-abutment teeth.

Conclusion: ARPDs can produce a lot of adverse effect on periodontal tissues due to the presence of foreign body in the mouth and it's suppression to the natural cleansing mechanism. The patients must be instructed in appropriate techniques of oral hygiene. ARPDs may be indicated as in term or transitional prosthesis for a period not exceed 6 months.

Key words: Acrylic removable partial dentures, adverse effect, oral hygiene, and periodontal diseases. (J Bagh Coll Dentistry 2010;22(3):80-82)

INTRODUCTION

There is a global trend for people to retain more teeth later in life. For this reason, it is common to see patients seeking treatment to replace the loss of a considerable number of teeth. Removable partial dentures are frequently prescribed for these patients. (1)

Wearing removable partial dentures resulted in higher plaque index, gingival index and loss of attachment compared to the controls and these differences were statistically significant. (2) The teeth touching the tooth-supported, clasps suffered from damage of the periodontal tissues. (3) Removable partial dentures may increase the incidence of caries, damage the periodontium and increase the amount of stress on natural teeth. (4-9) It is possible to reduce the negative effects of removable partial dentures on periodontium and perform good oral hygiene. (10) Only minor periodontal effects were noted in patients recalled regularly for supportive treatment including professional oral hygiene. (11) Fabin T- et al (12) stated that the remaining teeth are not damaged by well planned partial dentures (with metal base plates) while the wrongly planned dentures (with plastic base plates) develop a significant damaging effect.

MATERIALS AND METHODS

Human sample: The study sample is comprised of 30 patients (14 males and 16 females) ranging in age from 35 to 50 years. The patients are prepared to have ARPDs at private dental clinic all patients completed an oral hygiene program consisting of scaling and polishing one week before insertion the ARPDs. Drug users and diabetic patients are excluded. Patients instructed to wear the prosthesis at day time only. The duration needed to collect the patients for this study. Clinical examination: The oral examination was carried out on the for surfaces (buccal, lingual, mesial and distal) of all natural teeth abutment and non-abutment teeth, third molars were excluded.

The collected data include:
Plaque index (PLI) according to Silness and LOE, 1964. (13)
Gingival index (GI) according to LOE and Silness. 1963. (14)
Bleeding on Probing (BOP) if bleeding occurs within 30 seconds after probing the site was given a positive score whereas a negative score was given for non-bleeding site. The proportion of bleeding surfaces out of the total number of surfaces was calculated.
Probing Pocket Depth (PPD) the distance from gingival margin to the base of clinical periodontal Pocket was measured in mm. by using Williams's periodontal probe. Score (0): denotes a depth of; 3
mm. Score (I): denotes a depth of ≥ 4 mm. The proportion of surfaces with PPD ≥ 4 mm out of the total number of surfaces was calculated.

These clinical measurements were taken immediately before placement of ARPDs then 6 & 12 months after the placement.

RESULTS

Table 1 shows mean and standard deviation of PLI for both abutment and non-abutment teeth. The 30 patients presented with 750 teeth. 83 teeth were abutment and 667 non-abutment teeth. Because all the patients received an oral hygiene program one week before taking the index so all patients exhibited a low PLI scores, the initial mean PLI scores were 0.4 ± 0.05 for abutment teeth and 0.3 ± 0.15 for non-abutment teeth. After 6 months, of wearing the appliance all patients showed a markedly increase in PLI mean scores and this increase reached to 1.8 ± 0.16 for abutments and 0.9 ± 0.15 for non-abutments after 12 months. At 0 day there were low mean GI scores for both groups (0.2). After 6 months of wearing the prosthesis the mean GI increased to be mounted at (1.5±0.16 and 0.6±0.13 for abutments and non-abutments respectively). This increase continued to the end of the study 1.8±0.11 and 0.8±0.65) for abutments and non-abutments as shown in table 2.

Table 5 shows the percentage of surfaces which shows a sign of bleeding on probing during the study. The percentage of the surfaces which shows probing pocket depth ≥ 4 mm. at 0 day. 6 & 12 months after wearing the prosthesis is shown in table 4. Using t-test comparison a significant differences were found between abutment and non-abutment teeth (P-0.05) in the second and third visits for both plaque and gingival indices. There were non-significant differences in BOP and PPD between abutment and non-abutment teeth during the study.

DISCUSSION

The effect of ARPDs wearing was studied on periodontal parameter (PLI,GI,BOP, and PPD) of abutment and non abutment teeth. The results of this study showed significant increase in PLI and GI in abutment compared to non-abutment teeth, which has been proven in other studies. Considering the ARPDs as a predisposing factor to plaque accumulation could explain the increase in mean of PLI during the study. It has been observed that a strong inverse correlation exists between the prevalence and severity of periodontal disease and the level of oral hygiene, which is a measure of microbial accumulation on tooth structure. In the current study, relatively high mean GI scores at 6M and 12M were noted. This result was not surprising since PLI scores were mostly in linear relationship with GI scores. An increase in probing pocket depth in abutment teeth documented in this study occurred in a relatively short period of time. This was a result of relatively poor oral hygiene and persistent gingivitis. Our results disagree with Zlatan’c et al and Amran (15.19). This could be explained because of the short period of our study unlike the other studies, they examined the teeth 5 to 10 years after wearing the prosthesis. In spite of the non-significant difference in PPD between the abutment and non-abutment teeth but the minor difference could be regarded as initial stage in destructive which is important to diagnose and halt further destruction.

### Table 1: Mean of plaque index score and standard deviation with significance comparison between abutment and non-abutment teeth

<table>
<thead>
<tr>
<th>Months</th>
<th>Abutment Mean ± SD</th>
<th>Non-abutment Mean ± SD</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.4 ± 0.05</td>
<td>0.3 ± 0.15</td>
<td>N.S</td>
</tr>
<tr>
<td>6</td>
<td>1.2 ± 0.11</td>
<td>0.7 ± 0.12</td>
<td>S.</td>
</tr>
<tr>
<td>12</td>
<td>1.8 ± 0.16</td>
<td>0.9 ± 0.15</td>
<td>S.</td>
</tr>
</tbody>
</table>

* t= 1.64, p< 0.05

### Table 2: Mean of gingival index score and standard deviation with significance comparison between abutment and non-abutment teeth

<table>
<thead>
<tr>
<th>Months</th>
<th>Abutment Mean± SD</th>
<th>Non-abutment Mean± SD</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.2 ± 0.02</td>
<td>0.2 ± 0.11</td>
<td>N.S</td>
</tr>
<tr>
<td>6</td>
<td>1.5 ± 0.16</td>
<td>0.6 ± 0.13</td>
<td>S.</td>
</tr>
<tr>
<td>12</td>
<td>1.8 ± 0.11</td>
<td>0.8 ± 0.65</td>
<td>S.</td>
</tr>
</tbody>
</table>

* t= 1.64, p< 0.05

### Table 3: Percentage of BOP with significance comparison between abutment and non-abutment teeth

<table>
<thead>
<tr>
<th>Months</th>
<th>Abutment</th>
<th>Non-abutment</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0%</td>
<td>0%</td>
<td>N.S</td>
</tr>
<tr>
<td>6</td>
<td>18%</td>
<td>5%</td>
<td>N.S</td>
</tr>
<tr>
<td>&quot;</td>
<td>32%</td>
<td>12%</td>
<td>N.S</td>
</tr>
</tbody>
</table>

*z= 1.95, p<0.05
Table 4: Percentage of PPD with significance comparison between abutment and non-abutment teeth

<table>
<thead>
<tr>
<th>Months</th>
<th>Abutment</th>
<th>Non-abutment</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0%</td>
<td>0%</td>
<td>N.S</td>
</tr>
<tr>
<td>6</td>
<td>8%</td>
<td>0%</td>
<td>N.S</td>
</tr>
<tr>
<td>12</td>
<td>14%</td>
<td>3%</td>
<td>N.S</td>
</tr>
</tbody>
</table>

* $\chi^2 = 1.95, p < 0.05$

REFERENCES


