



## THE EFFECT OF REMOVABLE PARTIAL DENTURE ON PERIODONTAL HEALTH STATUS

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### ABSTRACT

Removable partial denture is a foreign body in the mouth and is an opportunity for accumulation of plaque and bacteria which cause an increase in quality and quantity of plaque on the other teeth and this will result in an increase in parameters of periodontium including (gingival index, plaque index and probing pocket depth). The population of study composed of 26 patients (16 males and 10 females), with age average from 30 to 59 years. They were separated into two groups. The first group (study group) composed of 13 patients with age between 30 and 59 years wearing a removable prosthesis, compared with second one (control group) composed of 13 patients with age range from 30 to 53 years not wearing a denture. Gingival index, Plaque index and probing pocket depth were calculated for entire patients. The result revealed that the patient who putting on a denture tend to have more accumulation of plaque, more inflammation of gingiva and more in destruction of periodontium than the patient not putting on a denture. It concludes that acrylic removable prosthesis tends to have a negative effect on parameters of periodontium when teeth are in communication with resin.

**KEYWORDS:** Partial denture, periodontal health.

### INTRODUCTION

Disease of Periodontium is a group of inflammatory disorders; the pathophysiology of this disease is associated with accumulation of microbial plaque on the teeth and the response of the host to those accumulations<sup>[1]</sup>. The name periodontal disease mostly refers only to plaque related inflammatory disease of the periodontal tissues. Albeit a wide category of oral mucosa diseases can also exert influence on the gingiva infrequently, therefore condition as lichen planus or tuberculosis can afford lesion in this area such conditions don't have any significant affect in the periodontal disease development in its commonly accepted sense<sup>[2]</sup>. Accumulation of microbial plaque on the surface of the teeth adjacent to the gingiva brings the oral junctional epithelial and sulcular cells into contact with enzymes, product and colonizing bacteria surfaces components. The irritation of the host tissues takes place when the bacterial load increases by these substances<sup>[3]</sup>. Periodontitis and gingivitis are the two important diseases of periodontium and may be present simultaneously gingivitis is a condition of periodontal disease in which gingiva are inflamed but there destruction is reversible meanwhile periodontitis is chronic inflammatory response with irreversible changes<sup>[4]</sup>. Numerous factors; systemic and local predispose towards accumulation of plaque or change the response of gingiva to plaque. These may be considered as secondary causing factors, which predispose toward the plaque accumulation deposits and prevent their removal; these are named plaque retentive factors. The host or systemic factors change the gingiva response in local irritation. These Local factors include: carious cavity, faulty restorations, badly designed partial denture,

malalignment of teeth, orthodontic appliances, mouth breathing, developmental grooves on cervical root surface or enamel and Tobacco smoking<sup>[5]</sup>. A further outcome of the badly designed partial denture is severing stress of occlusion on abutment teeth, and this with plaque-induced inflammation of gingiva is an extremely common cause of tooth loss<sup>[6]</sup>. Therefore the goal of this study was to evaluate clinically the effects of removable partial denture on periodontal health status.

### MATERIALS & METHODS

We were examined the gingival index, plaque index and probing pocket depth for entire patients.

**Human sample:** The participants enrolled in the study were come from the patient attending the Dentistry College, University of Baghdad. The entire study samples composite of 26 patients (10 females and 16 males) with age range from 30 to 59 years.

#### Those patients were separated into two groups:

1. **The first one (study group)** composite of 13 patients (5 females and 8 males) with age between 35 and 59 years and those patient putting on a denture for at least 3 months.
2. **Second one (control group)** also composite of 13 patients (8 males and 5 females) with age between 30 and 53 years and those patient not wearing a denture.

#### Inclusion criteria

1. General health of participant is good without any systemic diseases.
2. The patients in the study group should put on the denture for at least 3 months.

**Exclusion criteria:**

1. Patients with medically compromised condition.
2. Medicated patient.

**Study design**

The patients with removable prosthesis treatment were prepared to have all important dental treatment and restorations were finished. These involved instructions for oral hygiene, scaling and polishing and root surface cleaning of teeth with probing depth of pocket 4-7 mm under local anesthesia, and surgical root surface debridement of teeth with probing pocket depths greater than 7 mm with open flap procedures under local anesthesia. Restorative treatment involving correction of overhanging margins of restorative, restorations and endodontic treatment were also performed.

**Clinical examination:** The oral examination was performed on the four surfaces (lingual, buccal, distal and mesial) of all natural teeth (abutment and non-abutment teeth) with exclusion of third molars.

The collected data involved:

**Assessment of plaque index (PLI)** according to Silness and Loe, 1964<sup>[7]</sup>

The criteria for plaque index:

- 0: there is no plaque.
- 1: a film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be diagnosed by moving a probe across the surface of the tooth.
- 2: moderate amount of plaque accumulation on the gingival margin and /or adjacent tooth surface and within the gingival pocket, which can be seen by naked eye clearly.

3: abundance amount of plaque within the gingival pocket and/ or on the tooth surface and gingival margin.

**Assessment of gingival index (GI)** according to Loe 1967<sup>[8]</sup>

- 0: there is no inflammation/normal gingiva
- 1: mild inflammation, slight change in color of gingiva, slight edema, no bleeding on probing.
- 2: moderate inflammation, moderate glazing, edema, redness and bleeding on probing.
- 3: severe inflammation, marked redness, ulceration and tendency to spontaneous bleeding.

**Assessment of probing Pocket Depth (PPD)** the distance from margin of gingiva to the clinical periodontal Pocket base was measured in mm. by using periodontal probe of Williams.

Score 0: those involved depth from 1-3mm.

Score 1: those involving depth from 4-5 mm.

Score 2: Those involving depth 6 mm.

These clinical measurements were taken 3 \_ 12 months after the partial denture wearing and comparing the resulting with resulting parameter for controlled group.

**RESULTS**

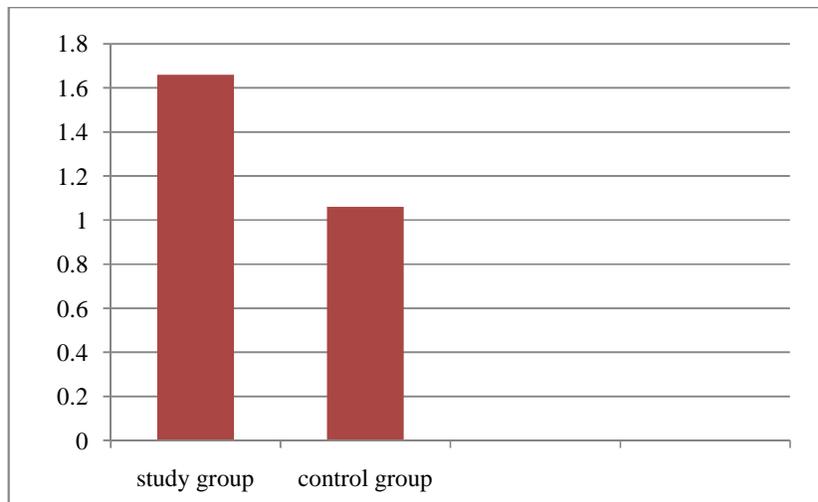
**Clinical Periodontal parameter Analysis**

**Plaque index (PLI):**

Table (1) and figure (1) reveals the mean value of PLI for both control and study groups. The 13 patient those putting on a denture their mean PLI  $1.66 \pm 0.44$  comparing with 13 patients which not putting on a denture  $1.06 \pm 0.29$ , a high significant statistical difference was observed between them with the P value (0.001).

**TABLE 1:** The mean value of PLI and standard deviation with comparison of sig. between study and control group

Parameter	Group	No.	Mean	± SD	T test	P	Sig.
PLI	Study group	13	1.66	0.44	-4.421	0.001	HS
	Control group	13	1.06	0.29			



**FIGURE 1:** Cluster bar chart compare mean value of PLI between study and control group

**Gingival index (GI):**

Table (2) and figure (2) reveals the mean value of GI for both study and control group. The 13 patient those putting on a denture their mean GI  $1.19 \pm 0.26$  comparing with 13

patients which not wear a denture  $1.10 \pm 0.32$ , a non-significant statistical difference were observed between them with P value (0.47).

**TABLE 2:** The mean value of GI and standard deviation with comparison of sig. between study and control group

Parameter	Group	No.	Mean	± SD	T test	P	Sig.
GI	Study group	13	1.19	0.26	- 0.7845	0.47	NS
	Control group	13	1.10	0.32			

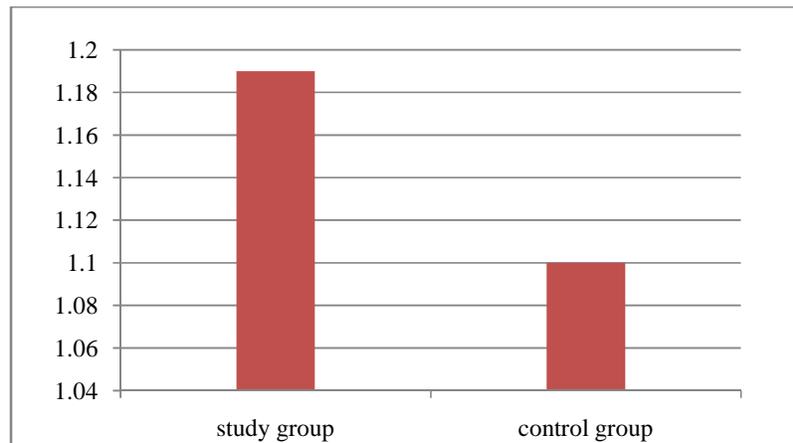
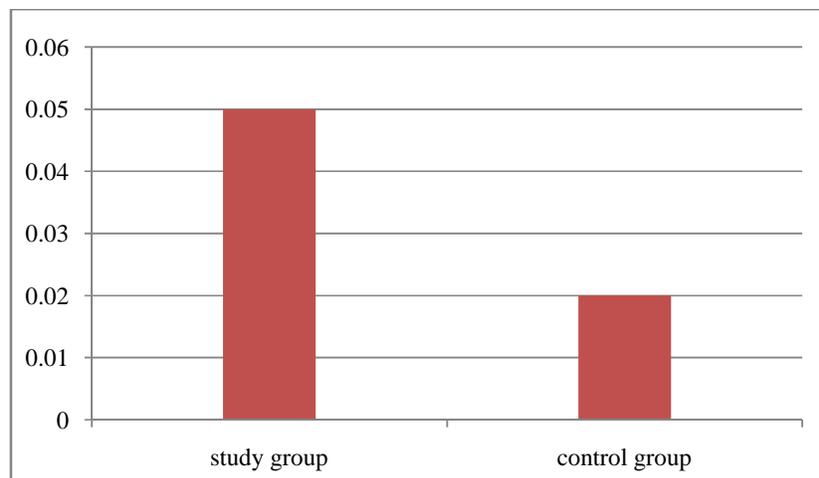
**FIGURE 2:** Cluster bar chart compare mean value of GI between study and control group**Probing pocket depth (PPD)**

Table (3) and figure (3) reveals the mean value of PPD between study and control groups. The 13 patient those wearing a denture their mean PPD  $0.05 \pm 0.07$  comparing

with 13 patient which not wear a denture  $0.02 \pm 0.06$  , a non-significant statistical difference was observed between them with P value (0.31).

**TABLE 3:** The mean value of PPD and standard deviation with comparison of sig. between study and control group

Parameter	Group	No.	Mean	± SD	T test	P	Sig.
PPD	Study group	13	0.05	0.07	1.04	0.31	NS
	Control group	13	0.02	0.06			

**FIGURE 3:** Cluster bar chart compare mean value of PPD between study and control group**DISCUSSION**

The results of this study showed that there was highly significant difference in plaque index between control and study group this fact agree with Chamrawy, 1976<sup>(9)</sup> and Suzely *et al.*, 2006<sup>(10)</sup> show that increase in the formation of the plaque on teeth in contact with RPDs due to the wearing of partial dental prosthesis that lead to the periodontal disease. But not agree with Linda, *et al.*, 2015<sup>(11)</sup> who proved that no statistically significant difference between PI between control and patients with RPDs. Reviewed 46 RPDs and their effects on plaque

accumulation. They concluded that a higher level of oral hygiene is required for RPD patients and that the denture design should be as simple as possible, covering only the essential hard and soft tissues. Similar observations were made in a 1-year study of three maxillary RPD designs<sup>(12)</sup>. Yeung *et al.*, 2000<sup>(13)</sup> in their study of cobalt-chromium RPDs reported a significant increase in the prevalence of plaque bacteria, gingivitis and gingival recession in and around the RPD abutment teeth, especially in areas within 3mm of the RPDs.<sup>35</sup> However, in other studies, patients with RPDs have reported only marginal inflammation<sup>[14, 15]</sup>. The results regard the gingival index and probing

pocket depth there was non-significant difference and this coincide with result obtain by Dula *et al.*, 2015 since found depending on the designs, support and type of denture of RPDs with clasp or with attachment minor differences that occur on the periodontal abutment teeth. Therefore there were no significant difference, because of the small number of patients with quadrangular and one point denture support of RPD<sup>[16]</sup>. Meanwhile these result disagree with result conducted by Augustin *et al.*, 2016 they found there is significant differences between study and control groups regarding gingival index, they attributed the cause to poor oral care<sup>[17]</sup>.

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