

A STUDY ON PATIENTS WITH UPPER REMOVABLE PARTIAL DENTURES AND THEIR EFFECTS ON PERIODONTAL TISSUES

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Introduction

The provision of removable acrylic partial dentures (RPD) is one of the treatment options for partially dentate individuals. However, the acrylic bases of these removable appliances may be plaque retentive, with resulting detrimental effects on the periodontal and dental tissues.

According to the design principles, any part of RPD should not be finished on the gingival margin and it should be on the tooth structure on or above the survey line and at least 2mm above the gingival margin (MacGregor & Lechner., 1994). If possible, gingival margins could be left uncovered in order to preserve the periodontal tissues (Lechner., 1985). A high prevalence of plaque, gingivitis and gingival recession, especially in dento-gingival surfaces in close proximity to the dentures has been reported. The increase in gingival inflammation has been attributed to direct trauma or gingival impingement caused by removable appliances. Therefore the objective of the present study was to compare the effects of removable acrylic partial dentures to periodontal tissues when the denture was designed at different positions relative to the gingival margin.

Materials and methods

Study sample comprised of 22 patients attending the dental (teaching) hospital with removable partial denture needs. The patients were randomly selected and any patient who was found either systemically or locally compromised (e.g. diabetes mellitus, smoking or other risk factors) was excluded from the study. This was in order to minimize confounding factors that may have otherwise significantly affected the data and the results

of this study. The random selection of patients was from the appointment book and the waiting list in the Department of Prosthetic Dentistry, Faculty of Dental Sciences, Peradeniya. Among the selected patients, only the upper partial dentures were considered for the study, replacing less than four teeth in the upper arch.

Initially, all patients were given a routine thorough phase of non-surgical periodontal therapy including sessions of plaque control methods at the Division of Periodontology, Faculty of Dental Sciences by the same investigator. This non-surgical periodontal therapy was given to the patient only after carrying out a detailed clinical periodontal examination for the important periodontal parameters given below.

Plaque score (PLS) (as a percentage)
Bleeding on probing (BOP) (as a percentage)
Probing pocket depths (PPD) (in mm)
Gingival recession (GR) (in mm)
Loss of attachment (LOA) (in mm)

Untreated caries were also treated where necessary by extending comprehensive restorative care. At the denture trial stage, the dentures were designed in such a way that the denture base plate was kept well relieved (10 x 6mm) from the gingival margin on right/left side (test side). The contralateral side of the denture base was relieved in the normal way and this was done by leaving contact with the tooth surface (control side). Thus, control side represented the conventional accepted denture design.

The sites of teeth in normal contact and not in contact with the denture base were assessed for the above parameters determining

periodontal health at the denture delivery, at 2 weeks, 3 months and 6 months from the denture delivery. Anterior (incisors and canines) and posterior teeth (premolars and molars) of test and control sides were compared separately.

All patients were given the standard periodontal maintenance care equally well according to the criteria for standards of care adhered at the Division of Periodontology, Faculty of Dental Sciences. Initial and subsequent periodontal assessment data for control and test sides were analyzed and statistically tested by using standard statistical tests (paired t-test, Bonferroni t-test and Chi-square test) in order to compare the differences/similarities between the above periodontal parameters with regard to the two denture base plate designs. $P < 0.05$ was considered as indicating statistically significant results.

Results

Pre-operative, 2 weeks, 3 months and 6 months post-operative results for PLS on test side were 53.77%, 48.50%, 53.05 and 54.77% respectively. It was 51.5%, 54.5%, 66.64% and 72.44% for the control side ($p < 0.001$).

Those results for BOP on the test side were 24.27%, 26.50%, 31.77% and 32.25% respectively.

The control side showed 24.27%, 30.91%, 40.18% and 40.18% ($p < 0.001$).

PPD of >3 mm pre operative and 6 months post operative data in the test group were 0 and 4% respectively.

Respective values for the control group were 3% and 31%.

Posterior teeth in the control side showed higher PLS and BOP than anterior teeth of the same side. Such difference was not found in

the test side. Although it was found that data related to GR and LOA showed significant difference in the control side, test side did not show such differences.

Discussion

Categorization of teeth in contact and not in contact with RPDs is an established method to study possible effects of denture wearing on oral health (Chandler & Brudwik., 1984). Some authors have reported that RPD are frequently considered to be responsible for caries and/ or periodontal lesions (Vanzeveren et al., 2003).

Some reports have found that degree of gingival change varied according to denture gingival relationship and also to the type of denture base material (Tawse-Smith et al., 2001). Our results confirmed that, the PLS and BOP got increased significantly with denture wearing in control side ($p < 0.001$). PPD, LOA and GR measurements at 3 months and 6 months were also increased significantly at sites of teeth in normal contact with denture and with duration of denture wearing ($p < 0.001$). The same was not observed in the test side.

Conclusions

Removable partial dentures tend to adversely affect periodontal health of individuals especially, when denture base plate is close to the gingival margin and should be relieved where possible.

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