



## The relationship between fixed prosthesis and gingival problems

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### Abstract

**Background:** This study was conducted to assess the relationship between fixed prosthesis and gingival problems.

**Material and methods:** The study included overall 100 subjects undergoing fixed prosthesis. The study included subjects without any periodontal pathology as well as patients requiring fixed prostheses. Patients with systemic diseases, complete missing teeth, pregnant women as well as smokers were excluded from the study. The Community Periodontal Index (CPI index) and the probe transparency method (TRAN), two validated assessment tools, were used to evaluate patients before and a year after prosthetic rehabilitation, taking into account the high prevalence of inflammatory periodontal diseases, the condition of periodontal tissues, and the gingival biotypes.

**Results:** In this study, out of 100 subjects, 50 were males and 50 were females. It was found that 31 subjects in total were healthy and had no periodontal pathology or complaints and 69 subjects had periodontal disease due to fixed prosthesis. Bleeding was observed in 12 subjects. Calculus was evident in 19 subjects. Gingivitis as well as periodontitis was discovered in 25 and 13 subjects, respectively.

**Conclusion:** It was observed that fixed prosthesis had affected the periodontal health of the subjects. The subjects had periodontal manifestations like bleeding, calculus, periodontitis as well as gingivitis.

**Keywords:** periodontal, gingiva, fixed prosthesis

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## Introduction

Proper treatment planning and prosthetic treatment are essential for the long-term outcome of prosthetic dental treatment. There is a strong association between prosthetic dentistry and periodontics as periodontal health has an important role in the longevity of fixed dental restorations [1,2,3]. On the other hand, defective prostheses may contribute to the progression of periodontal diseases [4]. The final finish of the prosthetic restoration also affects the development of biofilm, as increased surface roughness creates a favourable environment for microbial growth. Hence, a good prosthesis surface finish from proper manufacturing technique is important [5]. To achieve a successful treatment outcome, prosthodontists and periodontists should collaborate, to enhance the longevity of the restoration and improve periodontal health, as well as improve the quality of life for dental patients [3,6]. Morpho-functional impairments of the maxillofacial complex conditioned by periodontal pathology are five times more common compared with those arising from dental caries [7]. Periodontitis is an inflammatory disease involving the periodontal tissues (cementum, periodontal ligament, alveolar bone, and gingiva) supporting the teeth [8]

The accurate marginal and internal fit are essentially required for the success and longevity of fixed dental prostheses. An improper crown margin facilitates plaque accumulation, gingival sulcular fluid flow, and bone loss, which may lead to microleakage, recurrent caries, periodontal diseases, and ultimately the failure of prosthetic restorations [9].

Hence, this study was conducted to assess the relationship between fixed prosthesis and gingival problems.

## Material and methods

The study included overall 100 subjects undergoing fixed prosthesis. The study included subjects without any periodontal pathology as well as patients requiring fixed prostheses. Patients with systemic diseases, complete missing teeth, pregnant women as well as smokers were excluded from the study. The Community Periodontal Index (CPI index) and the probe transparency method (TRAN), two validated assessment tools, were used to evaluate patients before and a year after prosthetic rehabilitation, taking into account the high prevalence of inflammatory periodontal diseases, the condition of periodontal tissues, and the gingival biotypes. In a nutshell, each sextant's CPI was measured using a 0.5 mm ball-ended probe with coloured markings placed at 3.5 and 5.5 mm. The pressure inside the probe was kept under 20 g, as advised by the WHO. Six sextants (17-14, 13-23, 24-27, 37-34, 33-43, and 44-47) each had ten index teeth (17, 16, 11, 26, and 27 in the maxilla, and 47, 46, 31, 36, and 37 in the mandible) that were assessed.

## Results

**Table 1: gender-wise distribution of subjects**

Gender	Number of subjects	Percentage
Males	50	50%
Females	50	50%
Total	100	100%

Out of 100 subjects, 50 were males and 50 were females.

**Table 2: prevalence of periodontal disease among subjects undergoing fixed prosthesis.**

Prevalence of periodontal disease	Number of subjects	Percentage
Absent	31	31%
Present	69	69%
Total	100	100%

It was found that 31 subjects in total were healthy and had no periodontal pathology or complaints and 69 subjects had periodontal disease due to fixed prosthesis.

**Table 3: periodontal manifestations among subjects undergoing fixed prosthesis.**

Periodontal manifestations	Number of subjects
Bleeding	12
Calculus	19
Gingivitis	25
Periodontitis	13

Bleeding was observed in 12 subjects. Calculus was evident in 19 subjects. Gingivitis as well as periodontitis was discovered in 25 and 13 subjects, respectively.

### Discussion

Clinical studies have shown that fixed dental prostheses are essential for tooth restoration or tooth replacement. The patients' quality of life and oral health are improved through prosthetic rehabilitation utilizing fixed dental prosthesis [10]. The primary objective of restorative dental therapy is to restore the aesthetic, masticatory, and periodontal function of missing teeth. Although periodontal health is influenced by the restoration, it is crucial for a successful prosthesis [11]. Comparative evaluation of prosthetic structures is a difficult and incompletely understood topic [12].

Fixed prostheses, including prosthetic crowns (PC) and bridges, are widely accepted reconstruction therapies for teeth with compromised structures and edentulism. However, the presence of defective PC may be a predisposing factor for plaque accumulation and cause subsequent gingival inflammation, especially where the subgingival prosthetic margins were placed.[13] A recent national survey showed that PCs were associated with a higher prevalence of periodontitis.[14]

Non-surgical periodontal therapy (NSPT) has been proven to achieve pocket reduction and facilitated better patient oral hygiene maintenance. [15-18] Cobb reported that a 1–3 mm reduction in probing pocket depth (PPD) and a 0–2 mm reduction in clinical attachment loss (CAL) could be achieved following NSPT. This clinical improvement is mainly associated with the effect of mechanical debridement that alters the subgingival ecology through microbial biofilm disruption, reduces bacterial load, and suppresses inflammation.

In this study, out of 100 subjects, 50 were males and 50 were females. It was found that 31 subjects in total were healthy and had no periodontal pathology or complaints and 69 subjects had periodontal disease due to fixed prosthesis. Bleeding was observed in 12 subjects. Calculus was evident in 19 subjects. Gingivitis as well as periodontitis was discovered in 25 and 13 subjects, respectively.

A study done by Manasuri and Shrestha [19] at a tertiary dental care center in Nepal found that there was no association between the wearing of fixed and removable dental prosthesis and the periodontal disease and suggested the need for population-based oral health education programs and plaque control programs to reduce the incidence of periodontal disease.

In Passariello's study, patients underwent examinations 3–6 years after dental crowns were placed. Periodontally-affected sites displayed higher mean gingival bleeding index values than healthy ones, and statistical analysis showed that the differences were both obvious and significant at experimental and control sites [20].

According to another study, areas surrounding the abutment teeth presented periodontal pockets, attachment loss, congestion, bleeding on probing, and gingival hyperplasia after fixed restorations were removed. A hyperplastic reaction occurred on the epithelium's surface, and at the level of the chorion, an inflammatory chronic reaction was evident, with CD3+ T-lymphocytes making the majority of the cell population [21].

A study by Mansuri et al [19] was carried out to describe the periodontal status and to analyse the association of periodontal disease with the wearing of fixed or removable partial dentures in a Nepalese population reporting to the College of Dental Surgery, B P Koirala Institute of Health Sciences, Dharan, Nepal. This study comprised of a sample of 200 adult individuals. All data were collected by performing clinical examinations in accordance with the World Health Organization Oral Health Surveys Basic Methods Criteria. It included the Community Periodontal Index and dental prosthesis examination. Result A descriptive analysis was performed and odds ratio (1.048) and 95% confidence interval (1.001; 1.096) was found out. The mean age of the population participated in the study was  $41.82 \pm 14.80$  years. A total of 93 (46.5%) males and 107 (53.5%) females participated in the study. Among these subjects, 100% presented some periodontal problems. The statistical analysis indicated that the probability of periodontal disease with regards to wearing partial dentures was not significant as suggested by the odds ratio (1.048). It was concluded that there was no association of the wearing of dental prosthesis (RPD and/or FPD) with the periodontal disease.

## **Conclusion**

It was observed that fixed prosthesis had affected the periodontal health of the subjects. The subjects had periodontal manifestations like bleeding, calculus, periodontitis as well as gingivitis.

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