

## **The relationship between fixed prosthodontics and gingival problems; a cross-sectional study among patients visiting riyadh elm university clinics.**

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### **Abstract**

Periodontal health plays a significant role in the durability of prosthodontic restorations. The margin of discrepancy leads to enhanced build up of dental biofilm, microleakage, hypersensitivity, margin discoloration, increased gingival crevicular fluid flow (GCF), recurrent caries, pulp infection and, finally, periodontal lesion and bone loss, which can lead to failure of prosthetic treatment. The aim of this study was to evaluate the oral hygiene of patients having various types of fixed prosthesis. Overall level of oral hygiene among patients with fixed prosthesis was moderate. Age had a slight impact on oral hygiene, whereas type of prosthesis had a more significant impact on oral hygiene.

Keywords- Dental prosthesis, gingivitis, periodontitis

### **Introduction**

Periodontal health plays a significant role in the durability of prosthodontic restorations. The concerns of comparative evaluation of prosthetic constructions are complex and not completely understood. The margin of discrepancy leads to enhanced build up of dental biofilm, microleakage, hypersensitivity, margin discoloration, increased gingival crevicular fluid flow (GCF), recurrent caries, pulp infection and, finally, periodontal lesion and bone loss, which can lead to failure of prosthetic treatment. Before beginning prosthetic treatment, the situation of the periodontal tissues should be evaluated for their oral hygiene status, and gingival and periodontal conditions (Srimaneepong et al., 2022; Mehreen et al., 2019).

Gingivitis, is a mild symptom reported after fixing of Fixed Denture Prosthesis. Untreated gingivitis over the period of time with the growth of bacteria can result in periodontitis. Periodontitis is a serious gingival disease that can harm the soft tissue and bone that can lead to

tooth loss. Several studies have accounted for the relationship between fixed prostheses and the gingival problem. The health of the gingiva can be assessed by using the diagnostic tools like Plaque Index (PI) and Gingival Index (GI) (Hind. 2021; Al-Abdaly et al., 2018). While increased gingival index, bleeding on probing, probing depth and clinical attachment loss have been related with subgingival restorations, intracrevicular margins do not lead to periodontal diseases. Inflammation and bone loss occur, for both direct and indirect restorations, only with large overhangs. Different restorative materials are associated with different clinical responses when placed in the gingival sulcus or within the epithelial and connective tissue attachments. When the connective tissue attachment is removed, histological changes occur causing its apical shift and subsequent re-establishment. Gingival displacement during impression procedures can cause gingival recession (Ercoli et al., 2021; Ahmed et al., 2018; Nithisha et al., 2018). A previous study stated that the interrelationships between dental prostheses, abutments, and supporting periodontal tissue are dynamic. This retrospective cohort study collected demographic, dental, and social history data from patients with FDPs. Fixed dental prostheses quality was assessed using the United States Public Health Service Criteria, and periodontal health indices were measured. On the assessment, 74.2% had marginal discrepancy, 54.8% had subgingival margins, 22.6% had open or tight proximal contacts, and 8.1% had marginal caries. It was concluded that constructing FDPs with high-quality marginal fit and proximal contact promotes periodontal health (Al-Dabbagh, 2020).

Another similar study concluded that examination of correlation of oral hygiene and the periodontal disease showed that there exists a substantial impact between the two. It showed the dental care of the patient influences oral health outcomes. It showed that with the use of fabricated restoration, the occurrence of the plaque is higher as compared to the untreated reference tooth. Using a quantitative study design, the study showed that there is a need to promote fundamental dental health and hygiene practices among the patients, which overcome the risk of developing any oral disease (Hamed et al., 2019).

### **Aim-**

The aim of this study was to evaluate the oral hygiene of patients having various types of fixed prosthesis.

## Materials and Methods

This is a cross sectional study which was conducted among patients visiting Riyadh Elm University hospital campus. Patients were evaluated. Gingival health was evaluated using GI and PI. A total of 220 patients were examined. Sample size calculation was as follows. Confidence level 95% Population size 500, Margin of error 5% Sample size 220. Inter and Intra-examiner Reliability: Chronbach's coefficient alpha (intra-examiner reliability) value was 0.798 and Inter examiner reliability was 0.734.

Statistical analysis- Collected data was analyzed using SPSS version 26 where descriptive as well as inferential statistics were conducted. Chi square was done to determine an association of age and prosthesis type with gingival and plaque index with p value kept under 0.05.

## Results

Among the 220 patients examined, 34.2% were from age group 18-30 years, 36% from 31-45 years, 14% from 46-60 years and 15.8% from 60+ years (figure 1). Among these participants, most common prosthesis was veneers (52.6%), followed by crown and bridge (26.3% and 21.1% respectively) (figure 2). Regarding the participants' gender, 62% were males and 38% females. As far as their gingival index was concerned, 95% had moderate (GI value 1-2), whereas 5% had severe (GI value 2-3), with no patient exhibiting mild gingival index score (figure 4). Concerning their plaque index scores, 87% had moderate, whereas only 13% showed severe plaque accumulation (figure 5).

We compared the GI and PI scores on the basis of age and prosthesis type, which shows that GI had no statistically significant association with the age groups, whereas plaque index was higher among the 31-45 years age group as compared to other groups and this difference was statistically significant (p-value: .003). On the other hand, statistically significant differences were noted when compared the GI and PI with prosthesis type, with highest scores being observed when examined the patient with bridge (p-value: .000).

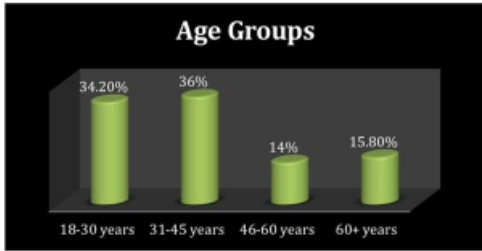


Figure 1: Age groups of study participants.

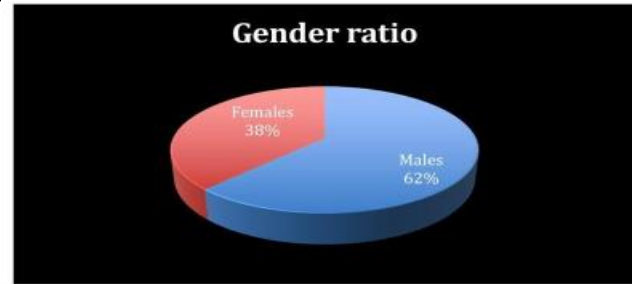


Figure 3: Gender ratio of the study participants.

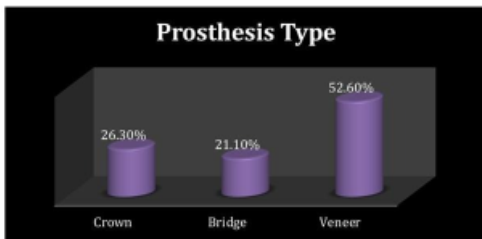


Figure 2: Prosthesis type among the study participants.

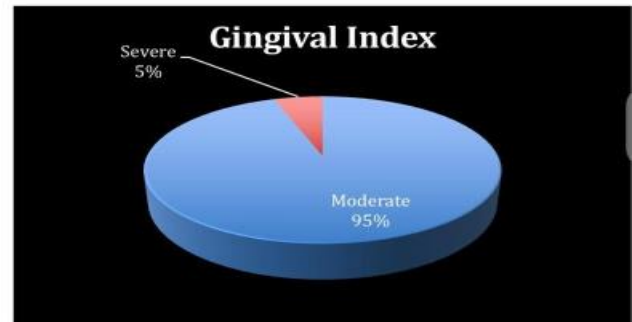


Figure 4: Severity of gingivitis among the study participants.

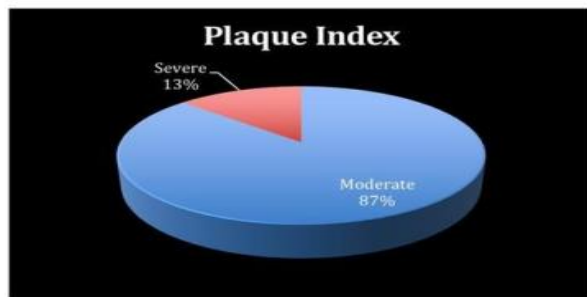


Figure 5: Severity of plaque accumulation among the study participants.

	18-30 years	31-45 years	46-60 years	60+ years	P-value
<b>Gingival Index</b>	Moderate: 100% Severe: 0%	Moderate: 88% Severe: 12%	Moderate: 100% Severe: 0%	Moderate: 94% Severe: 6%	.072
<b>Plaque Index</b>	Moderate: 100% Severe: 0%	Moderate: 73% Severe: 27%	Moderate: 81% Severe: 19%	Moderate: 94% Severe: 6%	.003*

Table 1: Comparison of GI and PI on the basis of age groups.

	Crown	Bridge	Veneer	P-value
<b>Gingival Index</b>	Moderate: 100% Severe: 0%	Moderate: 75% Severe: 25%	Moderate: 100% Severe: 0%	.000*
<b>Plaque Index</b>	Moderate: 100% Severe: 0%	Moderate: 38% Severe: 63%	Moderate: 100% Severe: 0%	.000*

Table 2: Comparison of GI and PI on the basis of prosthesis type.

## Discussion

It was observed from the findings that the overall gingival and plaque index scores were in the moderate to severe range. However, the highest scores were seen among patients with bridges, as compared to crown and veneer. A study designed to assess the oral hygiene and gingival condition in patients after placement of fixed dental prosthesis was carried out in Nepal. Their results revealed no significant difference in plaque index or gingival index among patients with single crown whereas fixed partial denture showed statistical significance (Basnyat et al., 2015). These findings are similar to what we observed in our study outcomes.

Another similar type of research being carried out in Macedonia aimed to estimate the oral hygiene and gingival condition in patients with fixed prosthodontic restorations. Their results confirmed that the Plaque and Gingiva index had higher values. Patients with crowns had better oral hygiene levels compared to fixed dental prosthesis wearers. No statistical differences were found for type of material. Also, younger patients showed better hygiene levels than the older ones (Zlatanovska et al., 2017). When compared with our results, it can be noted that our patients also showed higher GI and PI scores for bridges as compared to crowns. However, we only found significant difference in the PI scores of middle-aged group which is not the case with above-mentioned study.

A Saudi based study aimed to assess the periodontal status of Saudi adult females who had received regular oral prophylaxis following the insertion of fixed partial dentures. The effects of sub and supra-gingivally placed crown margins were also assessed. The results of this study indicated that in subjects with fixed partial dentures, the abutment teeth are more prone to periodontal inflammation than the non-abutment teeth. Additionally, the individual's age, duration of insertion of fixed partial dentures and location of the crown margins affect the periodontal health of the abutments (Al-Sinaidi & Preethanath, 2014). Our study findings reported higher scores of GI in fixed prosthesis as well, which is similar to these above-mentioned outcomes. Other similarities included association of age with oral hygiene; however we did not measure the association of duration of insertion and location of crown margins.

Another similar investigation by Milardovic Ortolan et al., (2012) aimed to assess and observe the oral hygiene and gingival condition in patients before and after fixed prosthodontic therapy through a 12-month period in combination with oral hygiene instructions. Their results revealed no significant difference in oral hygiene status among patients with FPDs made of

different materials. Younger patients showed better hygiene levels than the older ones. These findings are different to what we observed as we noticed a statistically significant comparison between various types of prosthesis used in the patients. Moreover, we observed better oral hygiene among the middle aged group which is not the case in above-mentioned study.

### Limitations of the study:

Factors such as duration of prosthesis insertion and location of crown margin were not included in our study, which could provide us with more detailed assessment of oral hygiene.

Other factors such as smoking habits and systemic diseases were also not included, which may have an impact on the GI as well as the PI scores.

### Conclusion

Overall level of oral hygiene among patients with fixed prosthesis was moderate. Age had a slight impact on oral hygiene, whereas type of prosthesis had a more significant impact on oral hygiene.

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