

PONTIC DESIGNS AND SOFT TISSUE HEALTH IN PATIENTS WEARING CONVENTIONAL METAL CERAMIC FIXED DENTAL PROSTHESES AT KING KHALID UNIVERSITY DENTAL CLINICS

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ABSTRACT

Objective: To determine the frequency of various pontic designs used in conventional metal-ceramic fixed dental prostheses (FDPs) and its effects on the health of soft tissues.

Materials and Methods: This descriptive cross-sectional study was carried out at the Prosthodontics clinics of College of Dentistry, King Khalid University, Abha, Kingdom of Saudi Arabia from October 2017 to June 2018. Data were collected on a well-designed questionnaire from a total of 97 patients presenting at the clinics and satisfying inclusion and exclusion criteria by discussion and clinical examination methods. SPSS version 19 was used for analysis $P \leq 0.05$ was taken as significant.

Results: A total of 97 patients from out-patient clinics were selected (56 males and 41 females) with an age range of 18-74 years (Mean age = 39.83 ± 11.20 Years). Ridge-lap was the most common (51.5%) type of the pontic design used in FDPs. A considerable number (40.2%) presented with subnormal tissue health under the pontics.

Conclusion: Dental practitioners in the region provide FDPs with unsuitable pontic design (ridge-lap).

Keywords: Pontic design, Fixed dental prostheses, Soft tissue health

INTRODUCTION

Replacement of missing teeth by fixed dental prostheses (FDPs) creates conditions for enhanced accumulation of food particles. Exacerbation occurs due to some pontic designs.¹ In dental literature, biologic complications in fixed restorations range from 0.6% to 4%.² Due to significant oral health issues,

Patients may not accept the most esthetic FDPs. Therefore, soft tissue health must be the first to consider during the restoration of esthetics and function in partially dentate patients with tooth-supported FDPs.³ Although shapes of the pontics are contemplated for different localizations and hygienic possibilities; biological complications associated with FDPs in terms of soft tissue health remain a matter of concern. Basic principles of prostheses production must be strictly adhered to, or inflammation of associated tissues may occur.⁴ As reported by two studies in two different dental schools in Jeddah, Kingdom

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of Saudi Arabia, periodontal disease and gingival bleeding were found to be the most frequent and highly prevalent biological complications in patients wearing FDPs.^{5,6} This suggests a decreasing survival rate with an increasing intraoral period of FDPs.

Design is the most important factor in preventing inflammatory reaction beneath pontics. The risk can be minimized if a clinician is knowledgeable and technically skilled. An effective treatment plan and mutual communication of the clinician and dental laboratory technician are equally important. Professionals involved in the process must detect existing problems well in time to reduce and prevent them.¹

The range of the study is enlarged because of the prevalence of clinically noticeable tissue reactions under some pontic designs. To the best of our knowledge, frequency of various pontic designs and its effect on the underlying soft tissues has not been investigated in the local population. The present investigation was, therefore aimed to find out the types of pontic designs used in FDPs and their effect on underlying soft tissues in the target population. Awareness of the current situation in the area will hopefully alert the clinicians towards designing the most suitable pontic and formulate an appropriate maintenance scheme for patients with FDPs.

The objectives of this study were to determine the frequency of different pontic designs used in FDPs and to evaluate its effect on the adjacent soft tissues in the local population.

MATERIALS AND METHODS

An ethical approval for the present study was obtained from the Scientific Research Committee of the College of Dentistry, King Khalid University, Abha, Kingdom of Saudi Arabia. A total of 97 patients (56 males and 41 females) wearing conventional metal-ceramic FDPs for at least six months were included in the study through non-probability convenience sampling. Their age ranged from 18 to 74 years. Severely ill, disabled, uncooperative and pregnant female patients having signs of pregnancy gingivitis were excluded. After informed written consent, the patients' age, gender and presenting complaints were recorded on a self-explanatory questionnaire. Location, number, design of pontics and place of fitting of FDPs were also recorded. The effects of various pontic designs

on the adjacent mucosa were also evaluated using the Modified Gingival Index (Lobene et al. 1986).⁷ Data were computed and statistically analyzed using the Statistical Package for Social Sciences (SPSS version 19.0). Descriptive statistics were used for all variables. One way ANOVA was used to test the significance of the data.

RESULTS

This cross-sectional study was carried out to evaluate the mucosal status under the pontics in patients wearing FDPs. Data were collected from a total of 97 patients of both genders, 56 Males (57.7%) and 41 Females (42.3%) with an age range of 18-74 years, with a total number of 132 pontics. Sixty-six per cent of them had no complaint of their FDPs while 34% of the participants had complaints of pain (11%), bleeding (13%) and both pain and bleeding (9%). In this study, most of the FDPs were located in the maxillary posterior quadrants (41%) while FDPs located in mandibular posterior quadrants comprised of 36% (Table 1). About 19% of FDPs were located in the maxillary anterior segment, while only 3% were seen in the mandibular anterior region. The various pontic designs seen were ridge lap (51.5%), modified ridge lap (26.8%), sanitary (8.2%), modified Sanitary (4.1%), Conical (4.1%) and Ovate (5.2%). More than half (53.6%) of the subjects in this research received their FDPs from private clinics, 24.7% got their FDPs fitted in teaching dental clinics. Only a small number (21.6%) of those reported received their FDPs from a general hospital. The mucosal status as evaluated by Modified Gingival Index (Lobene et al. 1986), 10.3% of the participants had no inflammation (grade 0), 40.2% with grade 2, 26.8% with grade 1, 21.6% with grade 3, and 1% with grade 4. Regarding the various pontic designs and the associated mucosal status, the results of this study were statistically significant ($p=0.053$).

DISCUSSION

Prevention of inflammatory reactions beneath the pontics is essential for the longevity and success of FDPs, and pontic design is the most important factor in this regard. Based on clinical experience, ridge lap types of pontics are not recommended anymore. Despite the fair oral hygiene in the majority of the participants of the study (66%), a substantial number (40.2%) presented with some degree of tissue inflammation under the pontics. This shows the

Table 1: Frequency of different pontic designs and their location

| Location –Design | Ridge Lap | Modified Ridge Lap | Sanitary | Modified Sanitary | Conical | Ovate | Total |
|----------------------|-----------|--------------------|----------|-------------------|---------|-------|-------|
| Maxillary Anterior | 8 | 11 | 0 | 0 | 0 | 0 | 19 |
| Maxillary Posterior | 23 | 9 | 4 | 1 | 2 | 1 | 40 |
| Mandibular Anterior | 2 | 0 | 0 | 0 | 0 | 1 | 3 |
| Mandibular Posterior | 17 | 6 | 4 | 3 | 2 | 3 | 35 |
| Total | 50 | 26 | 8 | 4 | 4 | 5 | 97 |

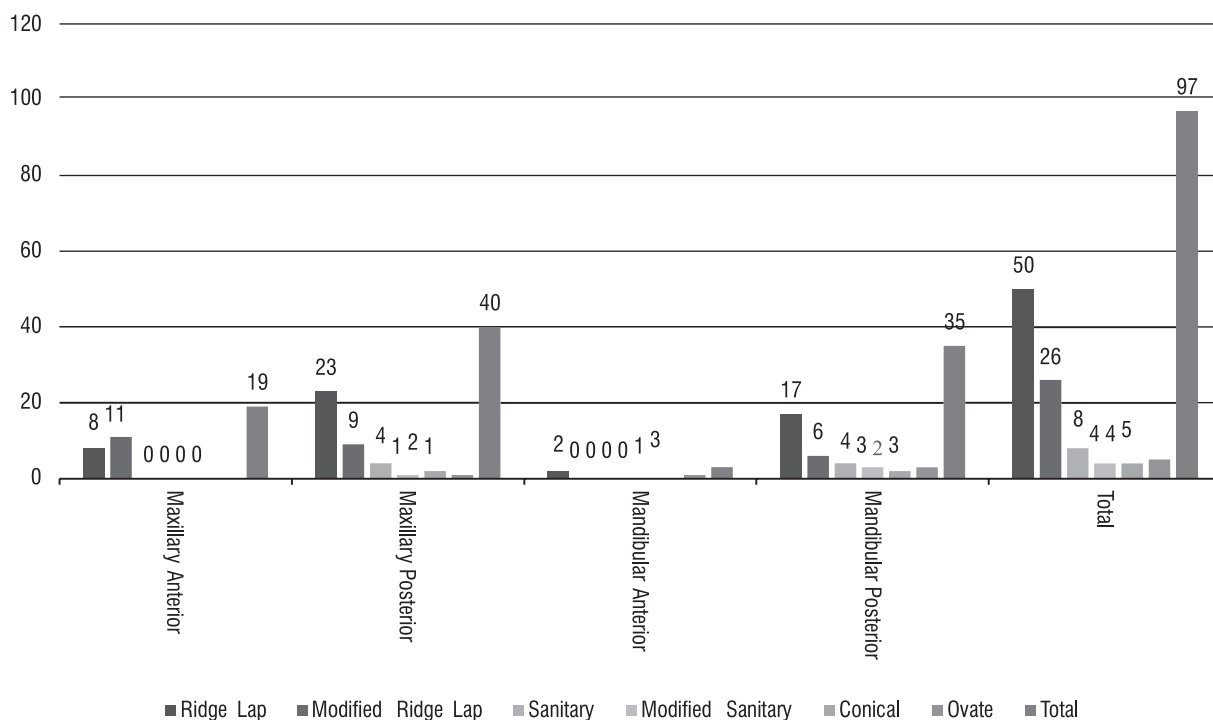


Fig 1: Pontic design and mucosal status under the pontics

effect of ridge lap design of pontic, which was seen in more than half (51.5%) of the FDPs. As there is no national or regional data available on the shapes of the pontics, the present investigation is the first of its kind in determining the frequency of various pontic designs and its association with underlying soft tissue health in patients wearing FDPs. However, the results of this study are compared with other related research to gather important information. In this study, gingival bleeding was seen in about one third (34%) and compromised soft tissue health in 40% of patients. This is in accordance with the results of two other related studies conducted in two different dental schools in Jeddah, Kingdom of Saudi Arabia.^{5,6} More than half (53.6%) of the subjects in this research received their FDPs from private clinics. The reason for the high percentage of these

biological complications can be attributed equally to both patients (poor oral hygiene) and clinicians (Ineffective treatment planning and unsuitable FDP/pontic design). As compared to male patients, FDPs performed well in female patients in this study. The lower number of female participants in this study and their better oral hygiene practices could be the likely causes for the better performance of FDPs in females.

In this study, the gingival index (Lobene et al. 1986)⁷ used was found to be a useful tool to evaluate mucosal health beneath the pontics and highlighted a disturbing situation. Reviewing the dental health care system is required for improvement. More than half of the participants of this study received FDPs from private clinics which is probably the reason for a substantial number of FDPs with some degree of

inflammation of the associated soft tissues. Therefore, dental practitioners in the private sector need to strictly follow contemporary guidelines of FDP construction and abide by strict ethical regulations. For private dental practitioners, participation in continuing dental education courses should be made compulsory. The specialist associations must come forward and regularly arrange skill development workshops to keep general dental practitioners up-to-date. Only qualified, well trained and professionally well-developed individuals must be allowed to practice in well-equipped settings.

CONCLUSION

Within the limitations of this study, the following conclusions can be made:

1. In more than half (51.5%) of the FDPs seen in the studied population, the pontic design was ridge lap, which is not recommended anymore.
2. About one third (34%) of the participants presented with tissue inflammation beneath the pontics.
3. More than half (53.6%) of the participants of this research had their FDPs fitted in private clinics indicating substandard designing and planning.

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