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KNOWLEDGE, ATTITUDE, AND PREFERENCE OF PONTIC DESIGN AMONG GENERAL DENTAL PRACTITIONERS OF LAHORE

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ABSTRACT

The objective was to evaluate the knowledge, attitude, and preferences of pontic design in fixed partial dentures among general dental practitioners of Lahore. It was a cross-sectional study that was conducted in the Department of Prosthodontics, de' Montmorency College of Dentistry / Punjab Dental Hospital, Lahore for one month from the 5th of August, 2021, to the 4th of September 2021. The sample size consisted of 100 general dental practitioners (GDPs). It was calculated using the EPI calculator with a 95% confidence level. This study was conducted among the GDPs of Lahore using a questionnaire. The questionnaire included the selection of pontic design according to the location in the arch and quantity of bone. The data was then analyzed using SPSS statistics software 20 version. Out of 100 participants, 96 responses were recorded in the final data collection. 91.9% of the participants constructed the Fixed Partial Dentures (FPDs). 85.9% of GDPs believed that the pontic design affects the mechanical, biological, and esthetic functions of fixed partial dentures. For the anterior segment, the modified ridge lap pontic was most common, i.e., 33%, followed by no specific preference, and ovate pontic design preference, i.e., 30% and 21% respectively. In the posterior segment, the hygienic pontic was the most common 34%, followed by no specific preference 29%. 33% of dentists had no preferences for pontic design in posterior resorbed ridges while 27% recommends hygienic / sanitary shaped pontic and 25% recommends conical-shaped pontic. Only 18.2% of dentists provide a written format and instructions to the laboratory regarding pontic design. It was concluded that more awareness about the design and fabrication of fixed partial dentures is required to keep the general dentists up to date about the latest guidelines in the selection of pontic design.

Keywords: *Knowledge, Attitude, Preferences, Pontic Design.*

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INTRODUCTION

A pontic is an artificial tooth on a fixed partial denture that replaces a missing natural tooth, restores its function, and usually restores the space previously occupied by the clinical crown.[1] Many designs have been proposed for the pontics following the principles of pontic design.[2] These designs can be subdivided into mucosal contacts and non-mucosal contacts.[1,2] Designs with no mucosal contacts include Sanitary/ Hygienic and Modified Sanitary / Hygienic. Sanitary or hygienic pontic includes a 2-3 mm gap between the tissue surface of the pontic and the ridge.[3] This design promotes easy cleaning between the tissue surface and ridge but creates irritation of the tongue, unaesthetic, and also creates food impaction under the pontic.[3,6] To counter these problems, a modified version of the sanitary pontic design was introduced which was shaped like an archway between two connectors.[6] These designs are most commonly used and preferred in the posterior region of the mouth where esthetics is not of prime importance.[3,4]

Designs which contact with the mucosa are more esthetic and are preferred in the anterior regions of the mouth they are: Ridge lap, Modified ridge lap, Ovate pontic, Modified ovate, and Conical.[4,9] Ridge lap

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pontic covers the ridge like the shape of a saddle, they create a problem for cleaning the food impactions and maintenance of periodontal health of the abutments as well.[4,5] To overcome this problem and maintain the esthetics a modified ridge lap design with a T-shape tissue surface area was developed which has a pinpoint contact.[5] It enables easy cleaning of the ridge area of the pontic and esthetically appears to grow out of the tooth. One of the advantages of a modified ridge lap is that it does not require any presurgical procedures.[1,6] On the contrary ovate pontics which have rounded tissue surface and embeds in the tissues at least 2 mm, require a certain pre-surgical procedure to prepare the ridge for the fixed partial denture.[9] But they provide excellent esthetic results and have a well-rounded cleansable tissue surface area.[6,10] They also have another edge over the ridge lap design in that the porcelain over the gingival area is well supported by the metal backing as compared to the ridge lap design. Hence the porcelain fractures rather easily in ridge lap design.[6,7] The conical shape or bullet-shaped pontic is recommended for the posterior ridge area where there is ridge resorption.[7,8] These pontics designs are selected according to the aesthetics desired, bone resorption, and space available for the pontic.[1] It is the responsibility of the restorative dentists to provide a written format to the laboratory regarding the design of the pontic.[1,9]

In a study by B.P. Singh et al. out of 216 dentists less than 25% dentists have knowledge and awareness about pontic design considerations.[24] In another study by Udhayaraja et al. where 100 general dental practitioners participated in the study only 34% have awareness about pontic design.[2] Since porcelain fused to the metal prosthesis is the most common material used in fixed dental prosthesis, it was the material selected for evaluation in this study. This survey aimed to assess the knowledge, attitude, and preference of a general dental practitioner in the vicinity of Lahore regarding the selection of pontic design for a fixed partial denture. This will provide an insight into the teachings and reinforcement of fixed partial dentures design at the undergraduate level as well as continuous education of general dental practitioners to keep them up to date about the latest standards and development.

METHODOLOGY

This survey was conducted in Lahore from 5th August 2021 to 31st August 2021 after approval from the ethical review board of de'Montmorency College of Dentistry, reference number 6968/DCD. A total of 100 general dental practitioners from Lahore were included in the study. The sample size was calculated using an EPI calculator with a confidence level of 95% and a 5% margin of error. The inclusion criteria of the study were qualified general dental practitioners from PMC recognized institutes, dentists graduated from multiple institutes were selected, dentists with at least one year experience of house job, dentists practicing in the vicinity of Lahore, dentists from different towns within the city and forms filled by the dentists. The exclusion criteria were dentists with post-graduate qualifications as this study aims only to determine knowledge of a graduate, dentists practicing outside Lahore, and incomplete questionnaires. Any form of compensation was not given for filling the form to the participants. A self-administered questionnaire with multiple choices was distributed among the dentists using google forms. The questionnaire included demographic information of the participants such as (practitioner's education, gender, and place of practice). The questionnaire was further categorized to evaluate the practitioner's knowledge, attitude, and preference about the pontic design selection. Total 6 questions were included in the questionnaire which inquires whether the dentist constructs fixed dental prosthesis, the importance of pontic design, selection of pontic design according to the location within the arch anteriorly and posteriorly, and pontic design preference according to the quantity of bone within the arch. A similar questionnaire was also used in the study by P. Udhayaraja et al. and S. M. Kazmi.[1,2] Informed consent was obtained from all the participants and they were given a clear and detailed briefing about the aims and objectives of the study attached along with the form. It was assured that the results obtained will be used for the study purposes only and all the information will be kept confidential Responses from the participants were evaluated in terms of numbers and percentages using the SPSS version 20 (IBM, Illinois, USA).

RESULTS

Out of 100 questionnaires, 4 were incomplete so they were omitted and the remaining 96 questionnaires were selected for the final data collection.

In question 1, participants were asked if they construct of fixed dental prosthesis. The result of question 1 is shown in the following figure:

Question 2 assessed the knowledge of pontic design and its importance if pontic design affects the biological, mechanical, and esthetic function of a fixed partial denture. The result of question 2 is shown in Figure 2:

In question 3 knowledge and preference of pontic design was asked in anterior tooth replacement. The result of question 3 is shown in Figure 3.

Question 4 assessed the knowledge and preference of a general dental practitioner regarding the pontic design in posterior tooth replacement. The result of question 4 is shown in Figure 4.

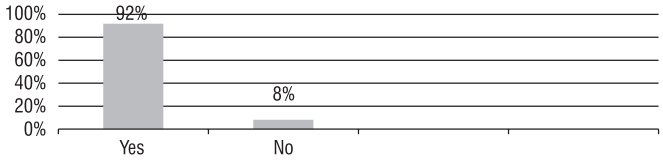

Fig 1: Do you construct a fixed dental prosthesis?

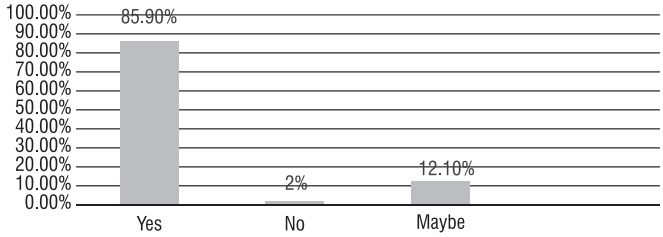

Fig 2: Does pontic design affect the biological, mechanical, and esthetic function of a fixed partial denture?

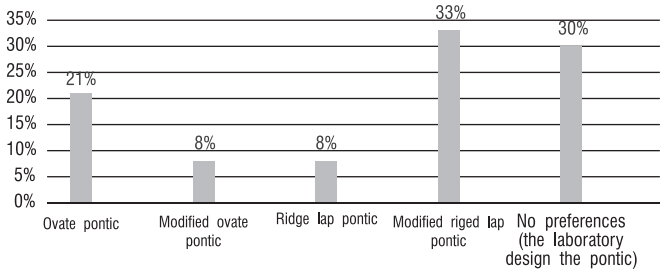

Fig 3: Which pontic design do you prefer in anterior tooth replacement?

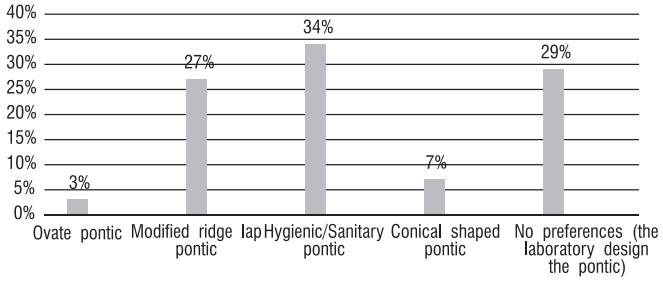

Fig 4: Which pontic design do you prefer in posterior tooth replacement?

Regarding question 5 knowledge and preference about the pontic design in posterior resorbed ridges was asked. The result of this question is described in the following Figure 5:

In question, 6 the attitude of the general practitioners was determined by asking how many dentists provide written instruction to the laboratory. Figure 6 describes the answer to this question:

DISCUSSION

In the current survey, it was observed that 91 dentists out of 96 opted that they do construct fixed partial dentures. 85.9% of the dentists in the current study agreed that pontic design does affect the mechanical, biological, and esthetic function of a prosthesis. Another

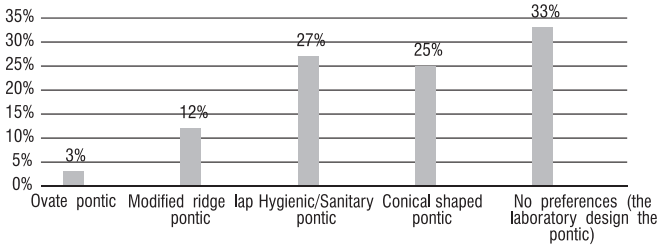

Fig 5: Which pontic design do you prefer in the resorbed ridges?

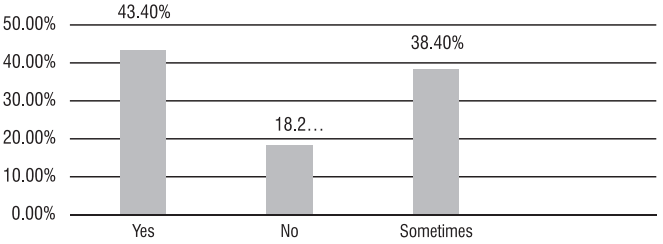

Fig 6: Do you send written instructions to the laboratory regarding the pontic design of the fixed dental prosthesis?

similar survey was done by Nagarsekar et al. which included 295 general dental practitioners from the city of Riyadh also concluded that 88 dentists agreed that pontic design affects the biological function of fixed prosthesis.[3] Their study was however a comparison between the responses of a graduate and a postgraduate concluding that postgraduates have better knowledge and awareness of pontic design and selection criteria.[3] The result of this study is also supported by another study conducted by Inan O, Secilmis A, Eraslan O where they concluded that pontic design also affects the mechanical and esthetic function of fixed dental prosthesis.[23]

The selection of pontic design in anterior tooth replacement not only affects the esthetic but also the phonetics of the patient.[11] The most esthetic pontic design in the anterior tooth replacement is the ovate pontic.[13] In our survey only 21% of dentists selected ovate pontic as the first choice for anterior tooth replacement while 33% agreed with modified ridge lap pontic design suitable for anterior replacement. The result of this study is comparable to the study done by S.M. Kazmi et al. in which 100 general dental practitioners from Karachi participated and 28% of dentists selected modified ridge lap design for replacing anterior teeth and only 15% of dentists selected ovate pontic for replacing anterior teeth.[1] However in contrast to our study, the study of S.M. Kazmi et al. does not mention if the participants were selected from all towns of the city and if they were all graduated from single or multiple institutes. In a similar study done by B.P Singh et al., 176 out of 216 general dental practitioners preferred ridge lap pontic design for anterior tooth replacement i.e., 81.4% and only 9 dentists preferred ovate pontic.[24] These studies

conclude that general dental practitioners do not have a complete awareness of pontic design selection in anterior missing teeth. Modified ridge lap pontic may provide esthetic results but the unsupported porcelain on the gingival aspect tends to fracture with increased forces also since the gingival architecture is not supported by the pontic the gingiva tends to shrink and create space between pontic and ridge.[6,15] According to Edellhoff et al. such a problem may result in an esthetic disaster especially in an esthetically concerned patient and patients with high smile line .[6,9]

For posterior tooth replacements where esthetics is not of prime concern hygienic or sanitary pontic design can be used.[8,10] Sanitary design pontic as the name implies creates an easy environment for plaque removal and hygiene maintenance.[1,16] In this survey 34% of the dentists opted that they preferred sanitary pontic design as a posterior pontic replacement option. These results are comparable to the results of a study done by S.M.Kazmi et al. where 34% of dentists selected sanitary design of pontic for replacing posterior missing teeth.[1] In another study done by Udhayaraja et al. 28% out of 85 general dental practitioners selected sanitary pontic design.[2]

When the buccolingual width of ridges in the posterior region of the mouth is resorbed the conical shape pontic design is a suitable design for replacing missing teeth.[7, 8, 10, 14] Since the pontic design with increased buccolingual width will compromise hygiene and will increase forces on the abutment teeth.[17, 18] Only 25% of the dentists in our current survey has preferred conical pontic design for posterior resorbed ridges. These results are comparable to another study done by Nazia Zareen et al. have concluded that only 20% out of 100 general dental practitioners have selected conical shape pontic for posterior resorbed ridges.[25]

Impression of the arches, interocclusal records, selection of shade, and written instructions to the laboratory regarding the design of the prosthesis and pontic in fixed partial denture is the responsibility of the dentist.[6,9,15] If such protocol is not followed any technical failure of the prosthesis is on the part of the dentist.[21,23] In our study 43.4% of dentists agreed that they do provide written instructions to the laboratory regarding the design of the fixed partial denture. A study by L. Sui et al. in China included 1600 questionnaires from 5 major laboratories all over the country and concluded that only 22% of the dentists provide written instructions to the laboratories about pontic design.[12]. A similar study was done by Shetty et al. concluding that only 25% out of 114 dentists provide a written format to the laboratories resulting in higher failure rates of FPDs.[17]

The strength of this study was that data was only collected from general dental practitioners to evaluate their knowledge and also dentists from every area of the city were included, which represents the general trends among general dental practitioners. As the study was questionnaire-based, human errors may be incorporated while filling the google form which reflects the limitation of the current study. This study is also limited by sample size and includes only one city within the country.

Pontic design selection should be done according to the contemporary guidelines provided by authors such as Rosenestial and Shillinberg as it affects the long-term survival and success of the fixed dental prosthesis.[6,13] A study done by Adriana Cristina Zavnelli et al. in 2018 concluded that in a year after the prosthesis insertion, 70.97% of the fixed partial denture had some kind of failure most of which was due to wrong pontic selection and design.[10]

CONCLUSION

The result of the current study suggests that more awareness on designing of FPDs should be provided to the GDPs. Reinforcement of FPDs designing with special consideration to pontic design should be done in teaching institutes. More emphasis should be laid on providing written instructions to the laboratory for FPDs designing.

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