

PONTIC DESIGN IN MANDIBULAR POSTERIORES: AN ORIGINAL RESEARCH

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ABSTRACT

Aim: Rehabilitation of a patient prosthodontically not only involves the rehabilitation of lost teeth but to restore the lost functionality and appearance too. Pontics replace the missing teeth and connector joins the retainer and pontics. The present study was undertaken to evaluate pontic designs in posterior mandibular regions.

Materials & Method: Forty patients were selected for the study and tooth preparation was carried out for all the subjects with deep chamfer finish line. Ridge lap pontic was prepared in 20 subjects and sanitary pontic was prepared in remaining 20 pontics. All the subjects with prosthesis were cemented and the subjects were recalled after one month and a questionnaire was prepared and was given to the subjects one month after the cementation of the prosthesis. The patients were informed to fill the questionnaire independently. Data was collected and analyzed statistically.

Results: Among all the patients tested, 34 patients (85%) had no complaint with concern to prosthesis, 2 patients (5%) complained of food lodgement in group 2 patients and 4 patients (10%) complained of tongue irritation in group 1 patients.

Conclusion: The clinical implication of the study is to use sanitary pontic when cleansing is the main concern and ridge lap pontic as pontic of choice where aesthetics is to be considered.

In the anterior region, where esthetics is a concern, the pontic should be well adapted to the tissue to make it appear that it emerges from the gingival surface. Conversely, in the posterior regions, mandibular premolar and molar areas, esthetics can be compromised in the interest of designs that are more amenable to oral hygiene.

Key words: Chamfer, Lodgement, Premolar, Sanitary.

Introduction

Rehabilitation of a patient prosthodontically not only involves the rehabilitation of lost teeth but to restore the lost functionality and appearance too. Fixed prosthodontics basically involves the preparation of adjacent abutments to provide a prosthesis that replaces the lost tooth both functionally and aesthetically.¹ Fixed prosthesis consists of three basic components: Connector, Retainer and pontics. Retainers provide the basic function of retention of the prosthesis and cover the abutments. Pontics² replace the missing teeth and connector joins the retainer and pontics. Pontic is defined as an artificial tooth on a fixed partial denture that replaces a missing natural tooth, restores its function and usually fills the space previously occupied by the clinical crown.

*"Tylman defines Pontics as the suspended member of a fixed partial denture which replaces the lost natural tooth, restores function and occupies the space of the missing tooth."*³ Pontics can be classified on the basis of contact with mucosa, esthetic appearance of pontic, on the basis of area it can be used and the shape of the pontic. Those in contact with mucosa include Ridge lap pontic, Modified ridge lap pontic, Ovate pontic and conical pontic where as those not in contact include sanitary and modified sanitary pontics.⁴ Selection of pontic depends primarily on esthetics and oral hygiene.⁵ In the anterior region, where esthetics is a concern, the pontic should be well adapted to the tissue to make it appear that it emerges from the gingival. Conversely, in the posterior regions, mandibular premolar and molar areas, esthetics can be compromised in the interest of designs that are more amenable to oral hygiene.

The present study was undertaken to evaluate pontic designs in posterior mandibular regions. Null hypothesis

states that pontic design has no effect in mandibular posterior region.

Materials and Method

The study was undertaken in Indira Gandhi govt dental college, Jammu. 40 patients were selected for the study.[Table 1]

Groups	Subjects	Type of pontic
Group 1	20	Sanitary pontic.
Group 2	20	Ridge Lap pontic.

Table 1: Distribution set up

Tooth preparation was carried out for all the subjects with deep chamfer finish line and impressions were made in polyvinyl siloxane. Impressions were poured in die stone and wax patterns were prepared using inlay wax. Ridge lap pontic was prepared in 20 subjects and sanitary pontic was prepared in remaining twenty pontics. Sprue wax was attached to the prosthesis in branch tree fashion and casting was carried out in alloy.

Casting was retrieved and ceramic layering or polishing in metal prosthesis was done with special considerations to the type of pontic prepared. Inclusion criteria was followed and divided in two different groups of 20 subjects in each group according to the type of pontic selected.[Table 2; Figure 1]

All the subjects with prosthesis were cemented with type 1 Glass ionomer cement and excess cement was wiped off. All the subjects were recalled after one month and a

questionnaire was prepared and was given to the subjects one month after the cementation of the prosthesis. The patients were informed to fill the questionnaire independently. Data was collected and analyzed statistically.

S No.	Inclusion Criteria
1.	Medically healthy patient
2.	Presence of only concerned prosthesis.
3.	Mentally fit patient
4.	Absence of any parafunctional habit.
5.	Absence of Any other missing antagonist teeth.
6.	Presence of single pontic in the prosthesis.
7.	Age group of 30-50 years.
8.	Seiberts Type 1 ridge defect.

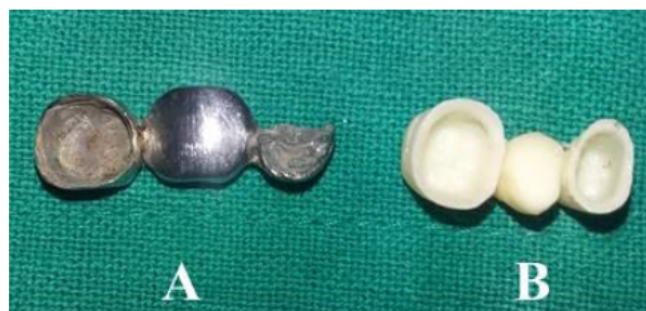


Figure 1: Types of pontics A] Sanitary Lap; B] Ridge Lap

Results

All the 40 patients were recalled after one month for post cementation check up. A questionnaire was answered independently by all the patients.

S No.	Questionnaire	Yes (Please Elaborate)	No
1.	Main problem with cemented teeth?		
2.	Does food stick in the cemented teeth?		
3.	Any problem in speaking?		
4.	Any problem in chewing?		
5.	Any other problem?		

Table 3: Questionnaire prepared

Among all the patients tested, 34 patients (85%) had no complaint with concern to prosthesis, 2 patients (5%) complained of food lodgement in group 2 patients and 4 patients (10%) complained of tongue irritation in group 1 patients. A particular point of interest was complaining of feeling of heaviness on the concerned side.

Discussion

The practice of fixed prosthodontics has continually evolved as a result of progress in science and the bio materials used. Multi disciplinary approaches, usage of

evidence based dentistry has led to improved procedures and finally better treatment for the patients. Fixed prosthodontics involves replacement of missing teeth by artificial substitutes cemented with the help of luting cement. Pontics are one of the prime components of fixed dental prosthesis that provides all the functions of the missing teeth. Several authors suggest several design requirements for successful dental prosthesis. For maintenance of oral hygiene,⁶⁻⁸ gingival embrasures around the pontic should be large enough to permit access with oral hygiene aids and Contact with the tissue should be minimal.⁹ For reduction of occlusal forces, buccolingual width of the pontic should be reduced by 30% to reduce the stresses on the prosthesis.¹⁰ For esthetic considerations, pontic should make proper emergence profile from mucosa. Null hypothesis that pontic design has no effect in mandibular posterior region stands rejected as a positive interaction was found between patient compliance and pontic design. The study was carried out one month after cementation of prosthesis so that to allow patients to adjust to new prosthesis and clearly find out any associated problems in one month. Two types of pontic designs were studied in the study as sanitary is the most common pontic design advocated by the books where as ridge lap pontic is the most common pontic designed in Indian laboratories. The aim of the study was to check these two pontics in relation to patient's perspective. Questionnaire was provided to every participant of the study so that to let the patients answer the problems independently without creating any bias in the study. Out of 40 patients, 34 patients (85%) had no complaint from the prosthesis 2 patients (5%) complained of food lodgement in group 2 patients and 4 patients (10%) complained of tongue irritation in group 1 patients. This suggest that majority of patients (85%) had no complaint with any of the pontic designs. (10%) complained of tongue irritation in sanitary pontic group. This can be explained due to the space of 3-4 mm present between ridge and inferior border of pontic which was found to be irritating with some patients. 5% patients complained of food lodgement in ridge lap patients which is due to minute spacing at the point of mucosal contact of pontic. Shohler I and Whiteman AE¹¹ conducted a similar study to evaluate different pontics and found sanitary pontic to be the ideal pontic design in mandibular posterior region. Binkley, Noble and Wilson¹² conducted a study on pontics and found ovate and ridge lap to be the best in term of esthetics and sanitary and modified sanitary to be the poorest in terms of esthetics. In our study, only 5 % of the subjects had food lodgement problem which contradicts the chief contra indication of ridge lap pontics. The reason for such a small percentage of patients having food lodgement complain can be the time duration of just one month. As time will pass, more and more residual ridge resorption will occur creating more food lodgement problem.¹³ The limitations of the study include less number of subjects and time duration of just one month. Further in-vivo studies are directed to study the pontic patterns in long term studies and inclusion of more subjects. The clinical implication of the study is to use sanitary pontic when

cleansing is the main concern and ridge lap pontic as pontic of choice where aesthetics is to be considered.

References

1. Rosenstiel SF, Land MF, Fujimoto J. Contemporary Fixed Prosthodontics. 3rd ed. Missouri: C.V. Mosby Co.; 1998.
2. Shillingburg HT, Hobo S, Whitsett LD, Jacobi R, Bracket S. Fundamentals of Fixed Prosthodontics. 3rd ed. Chicago: Quintessence Books; 1997.
3. Malone WF, Koth DL. Tylmans Theory and Practice of Fixed Prosthodontics. 8th ed. Tokyo: Ishiyaku Euro America; 1989.
4. Studer SP, Lehner C, Bucher A, Schärer P. Soft tissue correction of a single-tooth pontic space: A comparative quantitative volume assessment. J Prosthet Dent 2000;83(4):402-11.
5. Banerjee R, Banerjee S, Radke U. Ovate pontic design: An aesthetic solution to anterior missing tooth- A case report. J Clin Diagn Res 2010;4(4):2996-9.
6. Johnston JF, Dykema RW, Philips RW, Goodacre CJ. Johnston's Modern Practice in Fixed Prosthesis. 4th edition, Saunders, 1986, p. 140.
7. Aschheim WK, Dale BG. Esthetic Dentistry. 2nd ed. United States: Mosby Co.; 2001.
8. Liu CL. Use of a modified ovate pontic in areas of ridge defects: A report of two cases. J Esthet Restor Dent 2004;16(5):273-83.
9. Howard WW, Ueno H, Pruitt CO. Standards of pontic design. J Prosthet Dent 1982;47(5):493-5.
10. Stein RS. Pontic-residual ridge relationship: A research report. J Prosthet Dent 1966;16(2):251-85.
11. Shohar I, Whiteman AE. Reinforced porcelain system: A new concept in ceramometal restorations. J Prosthet Dent 1983;50(4):489-96.
12. Mclean JW. Dental Ceramics-Proceedings of the First International Symposium on Ceramics. Chicago: Quintessence Publishing; 1983.
13. Binkley TK, Noble RM, Wilson DC. Natural teeth pontics for a cast metal resin-bonded prosthesis. J Prosthet Dent 1986;56(5): 531-5.

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