

Original Article

A comparative study on tissue response under the ridgelap and modified ridgelap pontic

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ABSTRACT

The aim of this study is to compare the tissue response between the ridgelap pontic and modified ridgelap pontic. Total patients were 40. The fixed prosthesis were cemented by temporary cementing material. After providing the treatment, instruction on maintenance of prosthesis. Patients were visited and studied after 6 weeks, 12 weeks and 6 months to observe the condition of tissue response beneath pontic. The following necessary data were collected in respect of the condition of tissue beneath the pontic, color of gingiva. The modified ridgelap pontic is better than ridgelap pontic regarding tissue response.

The tissue response with the ridgelap surface of the pontic of fixed partial denture in 1st molar missing tooth enhanced the condition of the mucous membrane beneath the tissue surface of the pontic, condition of the abutment tooth, between ridge surface of the pontic and mucosa overlying the edentulous ridge achieved better success regarding fixed partial denture.

Introduction:

The pontic is the unit of a fixed partial denture that replace missing natural teeth and must satisfy several needs. They must restore function, be hygienically maintainable, be biologically and esthetically acceptable and be comfortable to the patient. The ridgelap pontics compress the tissue surface and modified ridge lap pontics has no or pin point contact to the tissue.

The function of a pontic is to withstand masticatory load, to permit effective oral hygiene, preserves underlying residual mucosa and adjacent abutment tooth. Thus provides esthetics as well as restore function.^{1,3} There are various type of pontic used in fixed prosthodontics. According to shape, the pontic can be divided into ridge lap, modified ridge lap, sanitary, modified sanitary and bar shaped pontic. Denture base type, saddle, modified saddle, conical, egg, bullet and heart shaped pontic also used in dentistry. According to material a pontic may be classified, all metal,

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metal and porcelain, combination of metal and resin.⁵ The ridgelap has a concave fitting surface that overlaps the residual ridge buccolingually, simulating the contours and emergence profile of the missing tooth on both sides of the residual ridge.^{6,8} However, saddle ridgelap design should be avoided because the concave gingival surface of the pontic is not accessible to cleaning with dental floss. The modified ridge lap pontic represents the best features of the hygienic and saddle pontic. Modified ridgelap design overlaps the residual ridge on the facial aspect to achieve the appearance of a tooth emerging from the gingiva but remains clear of the ridge on the lingual. To enable optimal plaque control the gingival surface of the pontic must have no depression or hollow. Tissue contact is very important for a pontic.^{7,8,9} The pontic should not be designed to pressurize the alveolar mucosa as it may produce ulceration.^{10,4} Tissue contact should be maintained. Previous concepts of close tissue adaptation are not followed lately. It should be remembered that patients maintenance (flossing) is more important than the pontic design.^{20,22} The ridgelap and modified ridgelap are comparable because they never contact soft tissue lingual to the crest of the ridge.^{2,11,12} The ridgelap would usually involve a slightly larger area of tissue contact and somewhat greater tendency to concavities in the contacting surface.^{17, 19} The modified ridge-lap is generally flat or slightly convex in all tissue contacting areas^{13,14}. This study was done to evaluate the tissue response underneath the modified ridgelap pontic and ridgelap pontic,^{15,16} to determine the condition of mucous membrane beneath the tissue surface of the pontic, condition interdental papilla under the connector of the fixed partial denture and to evaluate periodontal status of the abutment tooth.^{21, 23, 24}

Materials and Method

It was an observational comparative study. The study was carried out in the department of prosthodontics, faculty of Dentistry, BSMMU, Dhaka. The study was carried out during the period of January 2007 to December 2008. The patients come for seeking treatment for their missing mandibular first molar tooth in the department of Prosthodontics, faculty of dentistry, BSMMU, Dhaka. Total sample size

was 40. Patients having mandibular 1st molar missing with ideal abutments on both side as well as having class I edentulous ridge were included as the study sample.. The periodontally compromised abutment , tilted abutment, deformed ridge., edentulous area with recently extracted socket are excluded. All the patients who fulfill the inclusion criteria were included in the study until reach the targeted sample size.

Grouping of the sample

Group A : Consisted 20 patient with ridge lap pontic.

Group B : Consisted 20 patient with modified ridge lap pontic.

Study procedure

The prosthesis were cemented by temporary cementing material. After providing the treatment, instruction on maintenance of prosthesis.

The instruments needed to prepare teeth for a metal-ceramic crown include: Football or wheel-shaped diamond (for lingual reduction of anterior teeth), flat-ended tapered diamond (for shoulder preparation), finishing stones, explorer and periodontal probe, hatchet and chisel.

The preparation was divided into five major steps: guiding grooves for occlusal reduction, buccal reduction in the area to be veneered with porcelain axial reduction of the proximal and lingual surfaces and final finishing of all prepared surfaces. Three depth grooves were placed. One in the center of the facial surface and one each in the approximate locations of the mesiofacial and distofacial line angles. These was in two planes: the cervical portion was parallel to the long axis of the tooth the occlusal portion to follow the normal facial contour.

Posterior teeth generally require less (1.5 mm) because esthetics was not as critical. Caution was done because excessive occlusal reduction shortens the axial walls and thus common cause of inadequate retention and resistance form in the completed preparation. 1.5 mm buccal reduction was done.

Sufficient tooth structure had been removed to provide a distinct, smooth chamfer of about 0.5 mm width. The margins of the preparation were finished with diamond hand instruments or carbides. All unsupported enamel was subsequently finished by careful planing with a sharp chisel. Care was taken to orient the rotary instrument as it moves around the tooth.

Gingival retraction cord was used to expose the margin. The bleeding was controlled haemostasis. Impression was taken by silicone impression material. Impression was evaluated for any error. Model was prepared from the impression and send to the laboratory for fabrication of the prosthesis.

Before glazing, the prosthesis was tried on patient's mouth, any error was corrected. Then glazing of the prosthesis was done ridgelap surface in relation to gingiva was checked.

Insertion: The fixed partial denture was inserted by temporary cementing material for follow up.

Results and Observations

40 diagnosed mandibular 1st molar missing patients were included in this study. Out of 40, 20 patients were treated with fixed partial denture having ridgelap pontic and were included under group A. Rest 20 patients were included with fixed partial dentures having modified ridgelap pontic and were included under Group B. Among the 40 patients 22 patients were male and 18 were female, all of them having age ranging from 22 to 40 years. So there was no significance regarding age of sex. All these patients were evaluated under 2 parameters and those evaluation were described in tables. The parameters are the condition of mucous membrane and the condition of abutment tooth.

Table I: Distribution of patients between group A and B regarding condition of mucous membrane observed after 6 weeks, 12 weeks and 6 months

Grades	6 weeks				12 weeks				6 months			
	Group A		Group B		Group A		Group B		Group A		Group B	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Grade I	1	5%	1	5%	1	5%	15	75%	0	00	16	80%
Grade II	2	10%	1	5%	1	5%	5	25%	2	10%	4	20%
Grade III	10	50%	8	40%	8	40%	0	00	6	30%	0	00
Grade IV	7	35%	10	50%	10	50%	0	00	12	60%	0	00
X ²	17.633				32.917				34.667			
P value	0.001				0.001				0.001			

Data were analyzed using chi-square Test
 Significant = P<0.05
 Not significant= P>0.05
 Group A= Ridge lap pontic
 Group B= Modified ridge lap pontic
 Grade-I : Healthy gingival (Carrenza 1996)
 Grade-II : Mild inflammation, slight change color, slight edema, no bleeding on

probing.
 Grade-III : Moderate inflammation, redness, edema and bleeding on probing
 Grade-IV : Severe inflammation, marked redness and edema, ulceration, tendency to spontaneous bleeding.

Table II: Distribution of patients between group A and B regarding condition of abutment teeth observed after 6 weeks, 12 weeks and 6 months

Grades	6 weeks				12 weeks				6 months			
	Group A		Group B		Group A		Group B		Group A		Group B	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Grade I	3	15%	9	45%	3	15%	10	50%	2	10%	9	45%
Grade II	6	30%	7	35%	5	25%	4	20%	5	25%	4	20%
Grade III	4	20%	2	10%	7	35%	4	20%	5	25%	5	25%
Grade IV	7	35%	2	10%	5	25%	2	10%	8	40%	2	10%
X ²	6.521				8.063				8.166			
P value	0.089				0.045				0.043			

Data were analyzed using chi-square Test
Significant = $P < 0.05$ Not significant = $P > 0.05$

Group A = Ridge lap pontic Group B = Modified ridge lap pontic
Grade-I : No mobility and no pocket depth. (Carrenza 1996)
Grade-II : 2-3 mm of sulcus depth and slightly more than normal.
Grade-III : 3-4 mm of sulcus depth and moderately more than normal mobility.
Grade-IV : Above 4mm of sulcus depth severe mobility to faciolingually and mesiodistally.
In table III and fig. 7, 8 & 9 patients were evaluated between the groups regarding condition of abutment teeth.
In case of group A, 3 patients were found in grade I, 6 in grade II, 4 in grade III and 7 in grade IV whereas in group B 9 patients were in grade I, 7 were in grade II, 2 in grade III and 2 patients were found in grade IV, after 6 weeks. The chi-square test was done as the test of significance and the P value was > 0.05 which was statistically not significant. After 12 weeks interpretation 3 patients were found in grade I, 5 in grade II, 7 in grade III and 5 were found in grade IV respectively in case of group A, whereas 10 patients were found in grade I, 4 were grade II, 4 were grade III and 2 patients were found in grade IV in case of group B. The chi-square test was done as the test of significance and the P value was < 0.05 which was statistically significant. After 6 months interpretation in group A 2 patients were found in grade I, 5 were in grade II, 5 were in grade III and 8 were in grade IV respectively, whereas in group B grade I had 9 patients, grade II had 4 patients and there were 5 patients in grade III and 2 patients were grade IV respectively. The chi-square test was done as the test of significance and the p value was < 0.05 which was statistically significant.

Discussion

This is a comparative study was carried out to evaluate the condition of mucous membrane in patients having ridgelap or modified ridgelap pontic. The study was conducted in the department of Prosthodontics, BSM Medical University Shahbag, Dhaka from January 2007 to December 2008. The patients of the study were selected from the patients who attended in the department of Prosthodontics for the treatment of their missing teeth. In group A, the contact was not extended lingual to the crest or the ridge. The tendency for concavity

was greater in the under surface and it had a slightly larger area of tissue contact.

In group B, ridge contact was not extended further lingually than the midline of edentulous ridge. It was made flat or convex in all tissue contacting surface. According to the condition on the mucous membrane in relation to the ridgelap surface of the pontic the group B patients has shown better response and tissue tolerance than group A patients. Therefore in our study modified ridgelap pontic had better result compare to ridgelap pontic.

In a similar study Stein RS (1966) found that there were 20.8% patients in grade II and 13.8% patients in grade IV in ridgelap pontics after two week follow up visit. In another study Grisapin (1979) identified that the tissue response after one month to the denture base pontics was favourable. Tissue color was normal and there was no overt sign of inflammation or ulceration.

Hirshberg SM (1972) narrated in his research he found 8 patients in grade I, 46 in grade II, 18 in grade III and 4 in grade IV in case of ridge lap pontic after 12 months follow up visit. Hirshberg SM (1972) also identified that ridgelap pontic was as desirable than modified ridge lap pontic in maintaining mucosal health since inflammation developed beneath them, changing the ridgelap pontics to the modified ridgelap type alleviated inflammation.

According to the condition on the abutment teeth in relation to the ridgelap surface of the pontic the group B patients no different response in group A patients in 6 week up visit but less difference 12 week and 6 month follow up visit in group A. Therefore in our study either of the two could be suggested in 6 week follow visit. In a similar study, Tolboe H et al. (1998) identified that five patients developed impressions in the tissue with hypertrophy and pocket formation around the pontics. Mild to moderate inflammation in the mucosa was estimated with both the modified gingival index and the mucosal exudation when the oral hygiene was omitted in the pontic area.

Conclusion:

After completion of this observational comparative study it is concluded that the tissue response with the ridgelap surface of the pontic of fixed partial denture in 1st molar missing tooth enhanced the condition of the mucous membrane beneath the tissue surface of the pontic, condition of interdental papillae, condition of the abutment tooth, between ridge surface of the pontic and mucosa overlying the edentulous ridge achieved better success regarding fixed partial denture.

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