

Frequency of Faulty Inter-Proximal Contacts in Patients Receiving Fixed Dental Prosthesis

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Proximal
Contacts in Fixed
Dental Prosthesis

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ABSTRACT

Objective: The objective of the study is to determine the frequency of faulty interproximal contacts in patients receiving fixed dental prosthesis.

Study Design: Descriptive, cross sectional study.

Place and Duration of Study: This study was conducted at the Prosthodontics Department, Bacha Khan Medical College Mardan from 17 October 2017 to 17 April 2018.

Materials and Methods: Patients visiting the department of Prosthodontics, fulfilling the inclusion criteria was included in the study. Written informed consent was taken. Patients with porcelain fused to metal crowns and all metal crowns were assessed. The floss was passed through interproximal contacts under assessment. Proximal contact points were categorized as tight, open or loose and acceptable.

Results: Out of the 174 participants (Male and Female) enrolled in this study, mean age of the patients was 35.2 ± 7.9 . Stratification analysis was performed and observed that the porcelain fused metal crown success rate being acceptable higher in all age group like 25-35 age grouped showed 59% acceptable rate and 36-45 years age group acceptance were 52%. The age is strongly associated with porcelain fused metal crown (P value 0.059) while gender was not associated with porcelain fused to metal crown (p value 0.606).

Conclusion: This study showed that majority of the fixed dental prosthesis and metal crown were acceptable. Too tight or loose dental prosthesis can have their own consequences. Therefore, it is suggested that the crown should be evaluated properly by the dentists; both clinically and radiographically before final cementation.

Key Words: Inter-proximal contacts, Dental prosthesis, Proximal contact points.

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INTRODUCTION

Proximal contact points (PCP) play an important role in maintaining integrity and stability of the dental arch.^{1,2,3} Proximal contact points prevent the food from being trapped between teeth so avoid food impaction which can lead to periodontal disease.^{4,5} They also prevent the horizontal movement of teeth which can lead to occlusal trauma and premature contacts.⁶

To restore the proximal contact points of proper size and position is essential to the health of dentoalveolar

complex as well as the success of indirect restorations.^{7,8,9} Any variation in contact points has adverse effects on surrounding tissues.¹⁰

Flossing becomes extremely difficult in patients with tight contact points.¹¹ Tight contact points also make the area highly susceptible for caries, causes damage to periodontal tissues or interfere with the physiological placement of the teeth or cause unwanted tooth movement. Loose or slightly opened proximal contact points (PCPs) may also cause food impaction, dental caries, periodontal disease, and failure of occlusion and an undesirable drift of the teeth.¹²⁻¹⁷

FDPs (Fixed partial denture) retainers must be contoured properly to ensure that the patient has access for oral hygiene measures like tooth brushing and flossing.¹ Different method has been suggested in the past to check PCP before cementation. Acceptable contact points in FDPs are those that allow the floss to pass through with the same amount of resistance offered by the other contacts in natural dentition. In a study by Kim et al they determined the strength of PCPs with dental floss that passed through the interproximal contact with a snap.¹⁸ Dorfer et al. measured PCP strength with a calibrated metal strip (0.05 mm thick), and reported that the strength varied between teeth, arches and function.¹⁹ When new prosthesis was

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fabricated, the PCP had to be checked during try in stage on the cast and intra orally before final cementation.²⁰

MATERIALS AND METHODS

The descriptive cross-sectional study was carried out in the prosthodontics department, Bacha Khan Medical College Mardan. Written informed consent was taken from each patient for participating in the study. Patients with age range of 20 to 45 years both male and females were selected with non-probability consecutive sampling technique. The sample size of 174 was calculated using the WHO software. Patients with porcelain fused to metal crowns, full metal crowns and fixed partial denture with at least one adjacent natural tooth were included in the study. Patients with any periodontal symptoms, heavily restored teeth and fixed partial dentures with no adjacent teeth were excluded from the study.

Patients with porcelain fused to metal crowns and all metal crowns were assessed. Clinical assessment of interproximal contacts was done before cementation with the dental floss of waxed type. The floss was passed through interproximal contacts and were categorized as tight, open/loose and acceptable. The variables including age, gender, tightness of proximal contact point, material of prostheses (porcelain fused to metal crowns, all metal crowns) were collected on a structured Performa with 95% of confidence interval and 0.5% margin of error.

RESULTS

Data was entered and analysed by using SPSS version 20.0. Descriptive variables were expressed in percentages like gender and porcelain fused to metal crowns (acceptable, open or loose, tight) and all metal crowns (acceptable, open or loose, tight) were presented in the form of frequencies and percentages.

Table No.1: The Frequency distribution of variables (age and gender) of faulty inter-proximal contacts in patients (n=174) Variable n (%)S

Age (years) Mean ± S. D	35.2 ± 7.9
< 25	28 (16.1)
25-35	42 (24.1)
36-45	104 (59.8)
Gender	
Male	104 (59.8)
Female	70 (40.2)

Quantitative variables like age were calculated as Means. Porcelain fused to metal crowns (acceptable, open or loose, tight) and all metal crowns (acceptable, open or loose, tight) were stratified among age and gender to see effect modification by using chi square test keeping P-value ≤ 0.05 as significance. Post

stratification chi square test was applied and P-value ≤ 0.05 were taken as significant.

Out of the 174 Participants (Male and Female) enrolled in this study, mean age of the patients was 35.2 ± 7.9 . Patient's having open/faulty inter-proximal contacts according to age < 25 years were 16%, 25-35 years 24%, 36-45 years 60% %. In this study male were 59.8% and 40.2% female. (Table 1).

The assessment of proximal contacts was carried out in 92.5% porcelain fused metal crowns and 7.5% in all metal crowns. In porcelain fused to metal crowns 47.1% were acceptable, 33.3% were open or loose and 12.1% were tight while in all metal crowns 1.8% were acceptable, 4.6% were open or loose and 1% were observed tight showed in Table 2.

Table No.2: The frequency distribution of variables of faulty inter proximal contacts in patients with fixed dental prosthesis (n=174)

Fixed dental prosthesis			
Porcelain Fused To Metal Crowns n (%)		All Metal Crowns n (%)	Total
Acceptable	82(47.1)	8(4.6)	90(51.7)
Open or loose	58(33.3)	3(1.8)	61(35.1)
Tight	21(12.1)	2(1.1)	23(13.2)

Table No.3: Stratification analysis of Porcelain fused to metal crowns fixed dental prosthesis in Patients (n=174)

Porcelain Fused To Metal Crowns				
AGE (YEARS)	ACCEPTABLE	LOOSE	TIGHT	P-VALUE
< 25	10(35.7)	14(50.0)	4(14.3)	0.059
25-35	24(58.5)	16(39.0)	1(2.4)	
36-45	48(52.2)	28(30.4)	16(17.4)	
GENDER				
Male	46(47.9)	36(37.5)	14(14.6)	0.606
Female	36(55.4)	22(33.8)	7(10.8)	

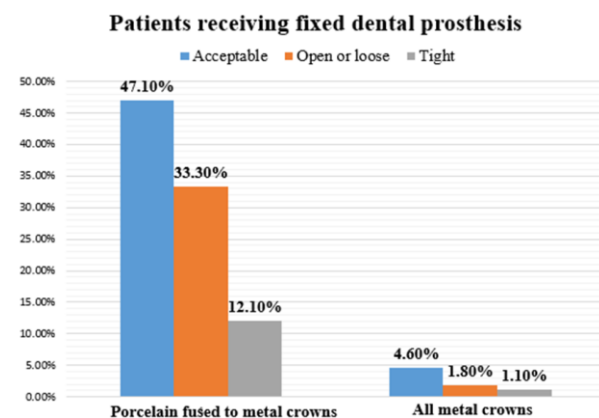


Figure No.1: Frequency of patients with fixed dental prosthesis N=174

Stratification analysis was performed and observed that the porcelain fused metal crown success rate being acceptable higher in all age group like 25-35 age grouped showed 59% acceptable rate and 36-45 years age group acceptance were 52%. The age is strongly associated with porcelain fused metal crown (P value 0.059) while gender was not associated with porcelain fused to metal crown (p value 0.606) (Table 3).

Stratification analysis was observed that all metal crown success rate of acceptable were not found significantly associated with age (P value 0.164) while gender also was not associated with all metal crown (P value 0.420) showed in Table 4.

Table No.4: Stratification analysis of all metal crowns fixed dental prosthesis in patients(n=174).

All metal crowns				
AGE (YEARS)	ACCEPTABLE	LOOSE	TIGHT	P-VALUE
< 25	—	—	—	0.164
25-35	0(0)	1(100.0)	0(0)	
36-45	8(66.7)	2(16.7)	2(16.7)	
GENDER				
Male	6(75.0)	1(12.5)	1(12.5)	0.420
Female	2(40.0)	2(40.0)	1(20.0)	

DISCUSSION

Literature suggested several methodologies of checking proximal contact point (PCP) before the cementation.¹⁸ The dentists usually measure the strength of suitable PCP in clinical treatment by passing floss with a snap. This technique was found simple however it was considered difficult to discover comprehensive changes in the strength.²¹ Moreover, discrepancies also existed in PCPs of crowns/FPD and anatomic contour that may have adverse effects on surrounding tissues in the form of tight and open PCP.⁸ One of the reasons of tight contact points can be over contoured crown on proximal surfaces reducing gingival embrasure that can lead to gingival inflammation; hence inhibiting effective oral hygiene. Therefore, every effort should be made to allow easy access to the interdental area for plaque control.²²

The present study evaluated the Frequency of faulty inter-proximal contacts in patients receiving fixed dental prosthesis. Stratification analysis revealed that the success of Porcelain fused to metal crowns was significantly associated with age specifically with 25-35 years age group. However, gender was not found related. All metal crowns no significant relationship was found with age and gender. A study evaluating the tightness of proximal contact points (PCPs) of fixed dental prosthesis with natural teeth assessed 142 PCPs and found that 58.4% were acceptable, 28.8% were loose and 12.6% were tight. This study included 55.1% females and 44.9% males having a mean age of 39 which was quite near to the findings of our study; as in our study the mean age was 35.2 ± 7.9 where the male to female proportion was 60% and 40% respectively.

Here, the term PCP referred to the area of proximal contour height on the mesial or distal surface of a tooth touching its adjacent tooth in the same arch.^{6,7}

In the study the single crown PCPs were 66.9% acceptable, 33.1% were of Fixed Partial Dentures with natural teeth in which 73.2% were Porcelain Fused to Metal and 26.7% were all metal; out of total PFM crown/FPD PCPs 56.7% were acceptable, 30.7% were loose and 12.5% were tight. Yet, from the total metal crown PCPs, 63% were acceptable, 23% were loose and 13% were tight which was in contrast and greater than our study where 5% of all metal crowns were acceptable, 2% were loose or open and only 1% were tight.⁶

A cross sectional study was carried out to know the inconsistencies between marginal integrity and contact points of Porcelain Fused to Metal (PFM) crowns and its relationship with caries in adjacent teeth. It found a significant association between faulty contact points and margins of PFM crowns with caries in adjacent teeth. Marginal overhang and marginal gaps on the mesial surfaces of PFM crowns were observed in 17.7% and 13.5% respectively. Tight contact points and open contacts of PFM crowns with adjacent teeth were 15.6% and 17.8% respectively on mesial surfaces. Caries was present in 33.3% and 20% of teeth were carious on mesial and distal to PFM crowns respectively. The association of faulty contact points of PFM crowns with caries in adjacent teeth was found significant ($p < 0.001$). The association of marginal discrepancy with caries in adjacent teeth was found significant ($p = 0.002$).¹⁰

Dentists frequently prepare the axial surfaces to be flat, pushing technicians to make over contoured crown with wide occlusal tables specially on distal surfaces of the posterior molars. Thus, the axial reduction of tooth structure needs to follow the original contour of the tooth so that ultimate restoration is much closer to the natural anatomy of that tooth, allows maintenance of oral hygiene to prevent caries on adjacent natural tooth surfaces.

CONCLUSION

The patency of proximal contact points should be similar to natural dentition in restorations of single or fixed partial dentures. The flossing method is simple and effective to assess the open, tight or acceptable proximal contact points. However, the quantitative assessment of the PCP tightness needs further investigation via standardized method to meet the standards of natural dentition.

Author's Contribution:

Concept & Design of Study:	Ambreen Usmani
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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