

Quality of Fixed Dental Prostheses and Associated Biological Complications in a Saudi Population

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ABSTRACT

Aim: The interrelationships between dental prostheses, abutments, and supporting periodontal tissue are dynamic. Clinical studies assessing the quality and associated complications of fixed dental prostheses (FDPs) in the Saudi population are scarce. The aims of this project were to assess the location and accuracy of marginal adaptation and proximal contact quality of FDPs provided by dentists in the Kingdom of Saudi Arabia and to assess the impact of these factors on the health of the periodontium and caries susceptibility.

Materials and methods: This retrospective cohort study collected demographic, dental, and social history data from patients with FDPs. Fixed dental prostheses quality was assessed using the United States Public Health Service Criteria, and periodontal health indices were measured. Descriptive and inferential statistics were used for data analysis. Logistic and multiple linear regression analyses were performed to assess predictors of caries risk and periodontal disease, respectively.

Results: Sixty-two patients with 62 FDPs were assessed. The mean patient age was 32.45 ± 9.0 (19–61) years with a male-to-female ratio of 3:1. On the assessment, 74.2% had marginal discrepancy, 54.8% had subgingival margins, 22.6% had open or tight proximal contacts, and 8.1% had marginal caries. Well-adapted margins promoted periodontal health, and inadequate proximal contact increased the risk of marginal caries.

Conclusion: This study suggests that 26% of FDPs provided by dental practitioners in the Western province, Kingdom of Saudi Arabia, were of high marginal fit and proximal contact quality.

Clinical significance: Constructing FDPs with high-quality marginal fit and proximal contact promotes periodontal health and reduces caries risk, thereby improving FDP outcome.

Keywords: Caries risk, Crown, Margin adaptation, Periodontal disease, Proximal contact.

The Journal of Contemporary Dental Practice (2020): 10.5005/jp-journals-10024-2887

INTRODUCTION

The interrelationships between dental prostheses, abutments, and supporting periodontal tissue are dynamic. These interactions are well documented both clinically and histologically. Ensuring the construction of a smooth and well-adapted interface can be challenging to the prosthodontist and, if suboptimal, may be associated with prosthesis failure.¹ The extension of fixed dental prostheses (FDP) retainer margins into the gingival sulcus should be considered a compromise, but esthetic and/or retentive demands often dictate this extension. The marginal fit should be optimal, and roughness due to open margins or type of material may lead to changes in bacterial ecology associated with periodontal disease.^{1,2}

Periodontal deterioration is a common biologic complication associated with FDP.^{3–5} Vergel de Dios assessed the effects of crown margin location on the adjacent periodontium and demonstrated either a preference for supragingival margins or no differential effect of margin position on the periodontium.⁶ Orkin and Bradshaw showed that subgingival prosthesis margins increased the chances of bleeding on probing and gingival recession compared to supragingival margins.⁷

It has also been shown that supragingivally located crown margins are advantageous to the health of the surrounding periodontium.⁸ However, in this study, marginal accuracy was noted to have an important long-term effect on the success of cast restorations and that marginal discrepancy had a negative impact on the periodontal health.⁸ Furthermore, Flores-de-Jacoby et al. showed that subgingival margins had increased plaque formation and probing depths when compared to supragingival margins. The microbial ecology of such subgingival margins with marginal

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How to cite this article: Al-Dabbagh RA. Quality of Fixed Dental Prostheses and Associated Biological Complications in a Saudi Population. *J Contemp Dent Pract* 2020;21(10):1130–1136.

Source of support: Nil

Conflict of interest: None

discrepancy was altered to contain more spirochetes, fusiforms, rods, and filamentous bacteria.^{1,9}

Caries is another biological complication associated with FDPs,^{3–5} and the relationships between dental prosthesis margin adaptation and location and risk of caries have been documented. The marginal adaptation and quality of inserted FDPs may influence caries susceptibility more than the marginal position in relation to the gingival margin.¹⁰ The caries-protecting role of subgingivally positioned retainer margins has been questioned by several studies demonstrating a risk of caries with subgingival margins.¹¹

The United States Public Health Service (USPHS) criteria is a rating scale used for the assessment of esthetic and functional qualities of existing restorations or prostheses.¹² The USPHS criteria were first introduced in 1972 and went through continuous modifications since its conception.¹² The parameters assessed in this system are color match, discoloration at cavo-surface margins, anatomic form,

marginal adaptation, and caries at margins.¹² Using well-defined scales in the assessment of existing restorations and prosthesis helps clinicians and researchers in producing meaningful, easy, and inexpensive information about these existing restorations.¹²

Clinical studies assessing the quality of FDPs in the Kingdom of Saudi Arabia have suggested that open margins are a common complication that significantly affects survival rates.¹³ However, clinical studies assessing the quality and associated complications of FDPs in Saudi populations are scarce. More clinical studies are needed to assess such complications so that remedial plans can be better formulated.

To address this knowledge gap, the aims of this study were to: (i) assess the location and accuracy of marginal adaptation of FDPs provided in public and private practices in the western province, Saudi Arabia, and (ii) assess the impact of the marginal fit and location on the health of the periodontium and caries susceptibility.

MATERIALS AND METHODS

This was a retrospective study of history and clinical examination data of patients with FDPs attending clinics in King Abdulaziz University Dental Hospital (KAUDH) between January and April 2014. The King Abdulaziz University Faculty of Dentistry (KAUFD) ethical and research committee approved the research proposal (Protocol # 002-13).

Inclusion criteria were patients with FDPs *in situ* for at least six months placed by dentists working in the Western province of Saudi Arabia and had no underlying medical condition. If the patient had more than one dental prosthesis, only a single prosthesis was randomly chosen. Only patients who fulfilled the inclusion criteria and agreed to participate in this research were recruited. Patients were asked to sign informed consent for participation.

History taking included data on the patient's age, gender, chief complaint, smoking, dental hygiene habits, and past dental history. Clinical examination included the assessment of existing dental prostheses and periodontal health assessment. The radiographic assessment included taking selective bitewing and periapical radiographs. Four dental interns were calibrated by a prosthodontist and a periodontist for two weeks before the study. Each examiner independently examined four patients with 3-unit metal-ceramic FDPs. The inter- and intra-examiner reliabilities after calibration were 85%. Recording and rating data were obtained by two examiners for each patient.

Evaluation of the prostheses included assessment of the retainer's marginal adaptation and marginal caries using modified USPHS criteria.¹² Inspection was visual with a mirror and tactile with a sharp explorer no. 23 (Table 1). The USPHS criteria included assessment of color match, discoloration at cavo-surface margins, anatomic form, marginal adaptation, and caries at margins. In this clinical study, the focus was only in the last two parameters. Each parameter would then be defined as Alpha, Bravo, Charlie, or Delta according to defined criteria.¹²

Additionally, retainer margin location in relation to gingival margin was recorded as either supragingival, equigingival, or subgingival. The quality of proximal FDP contacts was assessed visually and with a dental floss and was classified into intact, open, or tight. Porcelain chipping was recorded as no chipping, chipping, or separation from framework. Periodontal assessment of abutments included plaque accumulation (PLI), bleeding on probing (BOP), pocket depth (PD), and level of attachment loss (CAL) using a universal probe.^{14,15} Table 2 shows the criteria used to measure

Table 1: United States public health service criteria

<i>Marginal adaptation</i>	
Alfa	No explorer catches at margin
Bravo	Explorer catches at margin, no dentin exposed at base
Charlie ^a	Explorer catches at margin, dentin exposed at base
Delta ^a	Prosthesis is mobile, fractured, or missing in part or <i>in toto</i>
<i>Caries at margin</i>	
Alfa	No evidence of caries contiguous with the margin of the prosthesis
Bravo ^a	Evidence of caries contiguous with the margin of the prosthesis

^aUnacceptable prosthesis

Table 2: Criteria for plaque and gingival bleeding indices

<i>Plaque index (Leo and Sinless index¹⁴)</i>	
0	No plaque in the gingival area
1	A film of plaque adhering to free gingival margin and adjacent to the tooth surface, recognizable by running a probe across the tooth surface
2	Moderate accumulation of soft plaque within gingival pocket, on the gingival margin, and/or adjacent to the tooth surface, recognizable by naked eye examination
3	Abundance of soft plaque within the gingival pocket and/or adjacent tooth surface, recognizable by naked eye examination
Assess plaque accumulation for all four surfaces of abutment teeth and then divide total score of examined abutments over number of examined abutments	
<i>Gingival bleeding index (Ainamo and Bay index¹⁵)</i>	
0 and 1	Bleeding present
2 and 3	Bleeding absent
Assess gingival bleeding for all four surfaces of abutment teeth and then calculate the percentage of affected sites	

plaque and bleeding indices. Bitewing radiographs were acquired when proximal FDP margins could not be assessed clinically, and periapical radiographs were requested when there were associated clinical signs and symptoms.

All data were analyzed using IBM SPSS version 20 (IBM Statistics, Chicago, IL). Descriptive statistics included frequencies and percentages. The assumption of normality for PLI, BOP, PD, and CAL was not satisfied as assessed by Shapiro–Wilk test ($p < 0.05$). Accordingly, Mann–Whitney *U*-test and Jonckheere–Terpstra test were used, as appropriate, to detect differences between marginal adaptation, margin location, proximal contact, and caries and periodontal indices. Fisher's exact test and odds ratios (OR) with 95% confidence intervals (CI) were used to detect the rates of caries risk in patients with marginal discrepancy and quality of proximal contact. Logistic and multiple linear regression analyzes were performed to assess predictors of caries risk and periodontal disease, respectively. The level of statistical significance was set at $p = 0.05$.

RESULTS

Sixty-two patients with 62 FDPs provided by dental practitioners in public or private practice in the western province of Saudi

Arabia were assessed. The mean age of the patients was 32.45 ± 9.0 (range 19–61) years. Forty-six patients were male (74.2%) and 16 were female (25.8%). Forty-nine (79%) patients presented with functional problems as their chief complaint, while 12 (19.4%) patients presented with esthetic problems. Twenty (32.3%) of the examined patients brushed their teeth and nine (14.5%) patients brushed and flossed as part of their daily oral hygiene routine. Only 16 (25.8%) and 10 (16.1%) of the assessed patients smoked and visited their dentists regularly, respectively (Table 3).

On clinical examination of the 62 FDPs, 52 (83.9%) were FDPs, 57 (91.9%) were made of porcelain fused to metal (PFM), 46 (74.2%) had

two abutments, and 54 (87.1%) were posterior prostheses. Forty-seven (75.8%) dental prostheses had been *in situ* for 6 months to 5 years and 33 (53.2%) were provided by dentists in private practice (Table 3). Examining the quality of marginal adaptation of the dental prostheses, 16 (25.8%) prostheses had good marginal adaptation, 38 (61.3%) had acceptable marginal discrepancy (Bravo score), and 8 (12.9%) prostheses had unacceptable marginal discrepancy (Charlie and Delta scores) (Table 4).

Regarding the position of the cast restoration margins in relation to the gingival margin, 11 (17.7%) prostheses had supragingival margins, 17 (27.4%) had equigingival margins, and

Table 3: Demographics and characteristics of the cohort and prostheses

<i>Demographics of cohort</i>	<i>% (N)</i>	<i>Characteristics of prostheses</i>	<i>% (N)</i>
All patients	100 (62)	All prostheses	100 (62)
Gender		Type of fixed prostheses	
Male	74.2 (46)	Crown	16.1 (10)
Female	25.8 (16)	FDP	83.9 (52)
Age		Type of material	
≤33 years	64.4 (40)	All-ceramic	8.1 (5)
>33 years	35.5 (22)	PFM	91.9 (57)
Chief complaint		Number of abutments	
Discomfort	1.6 (1)	One	16.2 (10)
Esthetics	19.4 (12)	Two	74.2 (46)
Functional	79.0 (49)	Three–four	9.6 (6)
Oral hygiene habits		Location	
Do not brush nor floss	53.2 (33)	Anterior	12.9 (8)
Brush daily	32.3 (20)	Posterior	87.1 (54)
Brush and floss daily	14.5 (9)	Age of prostheses	
Smoking habits		6 months–5 years	75.8 (47)
None	74.2 (46)	≥5 years	24.2 (15)
Yes	25.8 (16)	Treatment provider	
Visit dentist regularly		Private clinics	53.2 (33)
No	83.9 (52)	Public clinics	46.8 (29)
Yes	16.1 (10)		

Table 4: Quality and associated complications of prostheses

<i>Quality of prostheses</i>	<i>% (N)</i>	<i>Complications associated with prostheses</i>	<i>% (N)</i>
Retainer margin adaptation		Porcelain chipping	
Alpha	25.8 (16)	No	88.7 (55)
Bravo	61.3 (38)	Yes	11.3 (7)
Charlie	11.3 (7)	Secondary caries at margins	
Delta	1.6 (1)	Alpha	91.9 (57)
Retainer margin adaptation		Bravo	8.1 (5)
Alpha	25.8 (16)	Periodontal inflammation	Mean ± SD (range)
Bravo/Charlie/Delta, 1 retainer	17.7 (11)	Plaque index	0.39 ± 0.35 (0–1)
Bravo/Charlie/Delta, 2 and more retainers	56.5 (35)	Bleeding index (%)	23.1 ± 15.9 (0–63)
Retainer margin location		Pocket depth (mm)	2.34 ± 0.42 (1–3)
Supragingival	17.7 (11)	Attachment loss (mm)	0.14 ± 0.29 (0–1)
Equigingival	27.4 (17)		
Subgingival	54.8 (34)		
Prosthesis proximal contact			
Intact	77.4 (48)		
Open	6.5 (4)		
Tight	16.1 (10)		



34 (54.8%) had subgingival margins. Among the abutments with supragingival, equigingival, and subgingival margins, 90.9%, 82.4%, and 64.7% had marginal discrepancy (Bravo, Charlie, and Delta scores), respectively. Among the assessed FDPs, 48 (77.4%) had intact proximal contacts (Table 4).

Assessing periodontal health around abutment teeth revealed a mean plaque index of 0.39 ± 0.35 , bleeding on probing of $23.05 \pm 15.9\%$, pocket depth of 2.34 ± 0.42 mm, and clinical attachment loss of 0.14 ± 0.29 mm. Further assessment showed that there were significantly greater plaque accumulation and bleeding on probing with prostheses with marginal discrepancy compared to those with well-adapted margins (Jonckheere–Terpstra test $p = 0.006$ and 0.032 , respectively) (Fig. 1). Consistently, marginal fit was a predictor of plaque accumulation and bleeding on probing as assessed by stepwise multiple regression ($p = 0.007$ and 0.04 , respectively) (Table 5). The predicted plaque accumulation and bleeding on probing for prosthesis with marginal discrepancy were more by 5 and 10 compared to retainers with well-adapted margins, respectively.

The incidence of caries at the margins of prosthesis retainers was low in this cohort. Only five (8.1%) patients had secondary caries at FDP margins. However, these five lesions affected abutment teeth at retainer margins that were not well adapted (three with Bravo score, two with Charlie score) or were supra- or equigingival in location (one supragingival, four equigingival). Further analysis revealed a higher risk of secondary caries among patients with

retainer margins positioned supra- or equigingivally compared to patients with retainer margins located subgingivally (Fisher's exact test, $p = 0.015$) (Table 6). The odds for the occurrence of secondary caries at prostheses retainer margins increased by 1.4 for supragingival/equigingival margins compared to margin subgingival location.

Additionally, there was a significantly higher rate of secondary caries in the patients with prostheses with inadequate proximal contacts compared to the patients with FDPs with intact proximal contacts (Fisher's exact test, $p = 0.008$) (Table 6). The odds for the occurrence of caries at retainer margins significantly increased by a factor of 12.5 for prosthesis with open or tight proximal contacts compared to prostheses with intact contacts. Consistently, proximal contact quality was a predictor of caries risk as assessed by logistic regression ($p = 0.03$) (Table 7). Furthermore, there was a significant increase in plaque accumulation at prosthesis margins with secondary caries (Mann–Whitney U -test, $p = 0.038$) (Fig. 2).

When the time of prostheses in function was considered, there was a non-significant and significant association with plaque accumulation ($p = 0.051$) and bleeding on probing ($p = 0.028$), respectively. Consistently, the age of the prostheses was a predictor of plaque accumulation and bleeding scores ($p = 0.03$ and 0.02 , respectively) (Table 5). Older prostheses (≥ 5 years) were associated with and predictors of lower plaque and bleeding scores. The predicted plaque accumulation and bleeding on probing for prosthesis that were *in situ* for more than five years were less by five compared to prostheses that were *in situ* for a shorter period.

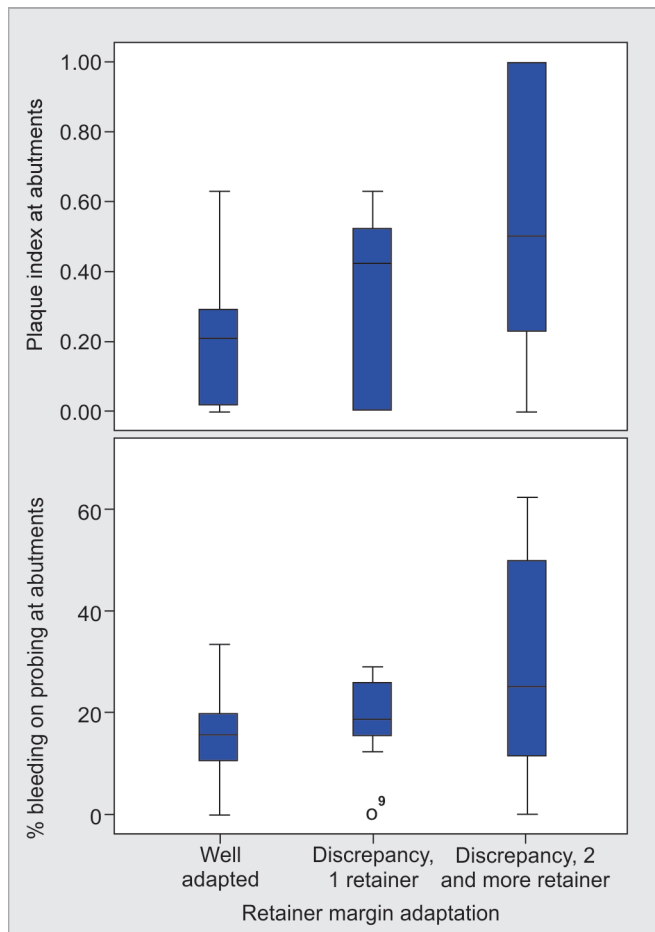


Fig. 1: Effect of retainer marginal adaptation on gingival health

DISCUSSION

Here, we describe a cohort of patients attending a tertiary educational dental hospital in Jeddah, Saudi Arabia, in whom 62 FDPs were assessed after at least six months of function. Clinical research evaluating complications associated with FDPs in Saudi Arabia is limited. We therefore aimed to assess the quality and associated biological complications of FDPs provided by dentists in the western province of Saudi Arabia.

In this cohort, the majority of FDPs had acceptable marginal adaptation (61.3%, Bravo score), 25% had well-adapted margins, and the remainder had unacceptable marginal adaptation that warrant replacement of the prosthesis. Sailer et al. reported similar rates of marginal adaptation quality in metal-ceramic FDPs after 10 years of service; of the assessed FDPs, 58.3% had acceptable marginal adaptation, 20.8% had well-adapted margins, and the rest had unacceptable margins.¹⁶ This low rate of well-adapted FDP margins could be related to the type of material and technique used to fabricate these prostheses; fabricating FDPs is technically challenging and should be provided by competent and experienced dentists in collaboration with well-trained technicians.

Although only 13% of the assessed FDPs had unacceptable marginal discrepancy that warranted prosthesis replacement, both acceptable marginal discrepancy (61%) and unacceptable marginal discrepancy were associated with an increase in plaque accumulation and bleeding on probing. While plaque indices were between 0 and 1, which is good to fair, there still was an increased association with bleeding on probing around abutments with marginal discrepancy (Bravo–Delta). This might be due to a qualitative rather than a quantitative effect of plaque; due to the presence of a gap (even a small Bravo score) between retainer and abutment, a change in bacterial colonization from health-promoting to disease-promoting may have occurred. Indeed,

Table 5: Multiple linear regression results predicting the presence or occurrence of periodontal disease at FDP abutments

<i>Predictor of plaque accumulation</i>	<i>B</i>	<i>95% CI</i>	<i>SE B</i>	<i>β</i>	<i>p value</i>
Retainer's margin adaptation					
Well-adapted	Ref.		–	–	–
Discrepancy	4.8	1.3, 8.2	1.7	0.4	0.007*
Retainer's margin location					
Supragingival/equigingival	Ref.		–	–	–
Subgingival	1.4	–2.4, 5.1	1.9	0.09	0.24
Prosthesis proximal contact					
Intact	Ref.		–	–	–
Open/tight	–0.4	–3.9, 3.2	1.8	–0.03	0.8
Time of prostheses in function (years)					
<5 years	Ref.		–	–	–
≥5 years	–4.5	–7.8, –1.2	1.6	–0.3	0.03*
Predictors of bleeding on probing					
Retainer's margin adaptation					
Well-adapted	Ref.		–	–	–
Discrepancy	9.8	0.4, 19.1	4.7	4.7	0.04**
Retainer's margin location					
Supragingival/equigingival	Ref.		–	–	–
Subgingival	–1.4	–11.6, 8.9	5.1	–0.03	0.8
Prosthesis proximal contact					
Intact	Ref.		–	–	–
Open/tight	2.1	–7.7, 11.9	4.9	0.06	0.7
Time of prostheses in function (years)					
<5 years	Ref.		–	–	–
≥5 years	–11.0	–20.0, –2.0	4.5	–0.3	0.02**

*Significant predictor, model $R^2 = 21.1\%$, model p value = 0.007

**Significant predictor, model $R^2 = 16.3\%$, model p value = 0.04

Table 6: Effect of retainer margin location and quality of proximal contact on caries risk

<i>Location of retainer margins [% (N)]</i>				<i>P value</i>
		Supra-/equigingival	Subgingival	Total
Secondary caries at retainer margins	Sound	37.1 (23)	54.8 (34)	91.9 (57)
	Cariou	8.1 (5)	0 (0)	8.1 (5)
	Total	45.2 (28)	54.8 (34)	100 (62)
Quality of proximal contact [% (N)]				
		Intact	Open/tight	Total
Secondary caries at retainer margins	Sound	82.5 (47)	17.5 (10)	91.9 (57)
	Cariou	20 (1)	80 (4)	8.1 (5)
	Total	77.4 (48)	22.6 (14)	100 (62)

marginal discrepancy has been shown to alter the bacterial balance to bacteria that promote periodontal disease.^{6,17}

The relationship between margin location and caries risk is well documented. In general, supragingival margins favor lower caries risk and subgingival margins promote plaque accumulation, increased caries risk, and are inaccessible to home oral hygiene care and professional prophylaxis and scaling.¹⁸ In this study, we reported a significant increase in caries risk with supra- and equigingivally positioned margins. This could be explained by the finding that among the examined prosthesis with supra- and equigingival margins, only 14% were well-adapted margins as compared to 35% of the subgingival margins that were well adapted. Indeed, it was demonstrated that marginal fit may be a more important

factor than its location for caries risk.^{19–21} Or, it could be that the subgingival position of more than half of the examined prosthesis (54%) is actually protective against caries. Although this concept is controversial, yet there are some studies that suggest this protective effect.¹⁰

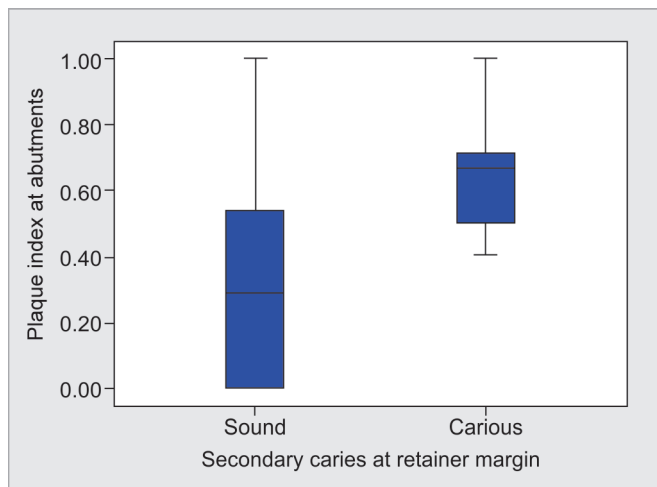
The risk between marginal discrepancy and secondary caries is well established.²² While there was no significant association between marginal adaptation and caries in this cohort, all five carious lesions that affected abutments had marginal opening (Bravo and Charlie scores). We may have failed to detect an association because of the small number of carious lesions affecting retainer margins in this relatively small cohort. Additionally, in the assessed cohort, plaque accumulation ranged from good to fair,



Table 7: Logistic regression results predicting the presence or occurrence of caries at retainer margins of FDPs

Predictor	B Coefficient	Standardized B	95% CI	p value
Retainer's margin adaptation				
Well-adapted	Ref.	–	–	–
Discrepancy	–17.7	0.0001	0.0000	0.9
Retainer's margin location				
Supragingival/ equigingival	Ref.	–	–	–
Subgingival	0.3	1.4	0.1–17.8	0.8
Prosthesis proximal contact				
Intact	Ref.	–	–	–
Open/tight	–2.6	0.08	0.007–0.8	0.03*

*Significant predictor, model $R^2 = 32\%$, model p value = 0.0001

**Fig. 2:** Association between caries at retainer margins and plaque accumulation

which might have contributed to the reduced caries incidence in spite of the inadequate prosthesis margins.

In our cohort, 77.4% had intact proximal contacts in FDPs, similar to other reports.²³ We found an increased risk of marginal caries in patients with prostheses with open or tight contacts. Indeed, the five carious abutment teeth had inadequate contacts, and thus, open and tight contacts were risk factors and predictors for caries in this cohort. A similar association has been reported by others.^{22,23}

Additionally, we reported that older prostheses (≥ 5 years) predicted improved periodontal health (less plaque and bleeding). No other associations were reported between the age of prosthesis since cementation intra-orally and other variables such as quality of prostheses margins, location of margins, and quality of proximal contacts. Thus, this reverse association between prostheses age and plaque accumulation and bleeding may be partly explained by smoother and superior quality of older fabricated prosthesis. Alternatively, this reduced plaque and bleeding could be related to well-formed retainers (not under or over contoured) that promote self-cleansing. Indeed, in this cohort, more than half of the assessed individuals did not brush their teeth every day, yet plaque accumulation around abutments was still low.

The failure rate reported in this study was 17.7% as defined by prostheses that need to be replaced because of marginal discrepancy (Charlie or Delta margins) or margins with recurrent caries. Although we reported that almost half (46.8%) of the assessed abutments had a bleeding index that was more than 20%, this increased bleeding on probing was not associated with increased pocket depth or attachment loss, thus did not warrant replacement and was not considered failures.

However, in a report by Fayyad and Al-Rafee, they showed that the failure rate of FDP in Saudi population from Riyadh was 35.5%.²⁴ The reported failures were mainly attributed to periodontal disease (36.6%) and caries (23.2%). The differences in failure rates between both reports could be due to differences in the definition of FDP failures. Here, the criteria were well defined and focused on marginal adaptation and caries, yet in Fayyad and Al-Rafee, their assessed parameters were not well defined and included esthetic failures as well.²⁴

In another study, Almogbel et al. reported a higher caries rate (32.5) and a similar inadequate proximal contact rate (27.5%) as compared to 8.1% and 22.6% in this study.²⁵ Both regional studies showed higher caries complications associated with FDP than in this study. This difference in caries risk might be cohort specific. Indeed, this cohort was from Jeddah, western province of Saudi Arabia, while the cohorts in Fayyad and Al-Rafee and Almogbel studies were from the central province of Saudi Arabia, Riyadh, and Qassim, respectively.

Restoring and replacing teeth with FDPs is common in dental practice, mainly due to the high prevalence of caries and periodontal disease in adult and geriatric populations.^{26,27} The success of such prostheses is highly dependent on the quality of the provided prostheses and patient compliance with home care and attendance at follow-up appointments. Constructing well-designed FDPs of optimal quality is technically challenging and necessitates competent dentists and collaboration with well-trained technical staff.

CONCLUSION

In conclusion, this pilot study suggests that 26% of FDPs provided by dental practitioners in the western province, Saudi Arabia, were of high marginal fit and proximal contact quality. This study highlights the importance of marginal adaptation and good proximal contacts in cast restorations and their impact on periodontal health and caries risk, respectively. Further work is needed to confirm these observations in a larger cohort and with more detailed information about the level of patient satisfaction and training of the involved dental practitioners. This work further emphasizes the importance of proper competency-targeted training and calibration of both clinical and technical dental personnel.

CLINICAL SIGNIFICANCE

Constructing FDPs with high-quality marginal fit and proximal contact promotes periodontal health and reduces caries risk, respectively, thereby improving FDP survival and success rates.

CONFLICT OF INTEREST STATEMENT

The author reports no conflicts of interest and has no financial interest in the companies whose materials are included in this article.

AUTHOR CONTRIBUTION STATEMENT

Raghad Al-Dabbagh conceived, designed, and interpreted the work, drafted and wrote up the manuscript, revised it critically, approved the version to be published, and agreed to be accountable for all aspects of the work.

ACKNOWLEDGMENTS

The author would like to thank Dr Othman Alsulaimani, Dr Ahmed Mallouh, Dr Ayman Banjar, and Dr Ahmed Abuzinadah for collecting the data and assessing patients and FDPs in this cohort. She would like to thank Dr Dalia Meisha for her valuable input and data analysis and Dr Rayan Kayal for his contribution in calibrating the above-named examiners in periodontal assessment.

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