

Assessment Of Causes Of Failures Of Fixed Partial Denture Running Title: FPD Failure

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ABSTRACT

Background: *The present study was conducted to assess causes of failures of FPD.*

Materials & Methods: *142 patients of both genders who had FPD failures due to various reasons were included. The cause of failure was recorded.*

Results: *Esthetic causes were over contoured margin in 12, under contoured margin in 6 and unacceptable color match in 8 cases. Other causes of failures was loss of retention in 30, periapical pathology in 12, bridge fracture in 10, caries in 8, coronal tooth fracture in 7, occlusion problem in 5, porcelain fracture in 13, mobility of abutment in 5, perforation in 4, food lodgement in 8, occlusal wear in 10 and sinus formation in 2 cases. The difference was significant ($P < 0.05$).*

Conclusion: *Common cause of failures was under contoured, over contoured margin, loss of retention and periapical pathology.*

Key words: *Caries, FPD, Over contoured margin*

Introduction

Replacement of missing teeth in partially edentulous arch involves various treatment options like removable, fixed prosthesis, and implants. Fixed prosthodontic treatment can offer exceptional satisfaction for both patient and dentist. Restoring and replacing of teeth with FPDs represents an important treatment procedure in dental practice, mainly because of the continuing high prevalence of caries and periodontal diseases in the adult and geriatric populations.¹

A fixed partial denture is defined as a fixed restoration which replaces one or more missing teeth and is attached to natural teeth or an implant. In case of improper treatment planning, they are more likely to fail prematurely and lead to irreversible damage to the teeth and supporting structures.² In recent years, several investigators have taken great interest in investigating the life span and long-term quality of fixed dental prosthesis. Some of the common failures in fixed bridge prosthodontics are loose retainers, fracture of soldered joints, fracture of porcelain, fracture of the abutment teeth or voids in retainer or pontic. Failure of these restorations may also lead to recurrent caries or loss of abutment teeth.³ Complications resulting from rehabilitation treatment with prostheses are factors that may occur during or after treatment. The dentist should know such complications, in order to be able to conclude a detailed diagnosis, treatment planning and execution of procedures giving special attention to the most frequent failure factors, and thus meeting the patient's expectations and planning the post-treatment care and maintaining.⁴

Most of the time, complications are conditions that occur during or after an appropriately performed fixed prosthodontic treatment procedures. There are three main types of failures Biologic failure, mechanical failure and aesthetic failure.⁵ Clinical failure may occur during or after fixed prosthodontic treatment procedure. Failure and complications associated with fixed prostheses include, but not limited to the loss of retention, caries, endodontic complications, periodontal disease, tooth fracture or porcelain fracture, and unsatisfactory esthetics of the prosthesis.⁶ The present study was conducted to assess causes of failures of FPD.

Materials & Methods

The present study was conducted in the department of Prosthodontics on 142 patients of both genders who had FPD failures due to various reasons. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained from institutional ethical committee.

General information such as name, age, gender etc. was recorded. The cause of failure was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 142

Gender	Males	Females
Number	82	60

Table I shows that out of 142 patients, males were 82 and females were 60.

Table II Esthetic causes of failures

Causes	Number	P value
Over contoured margin	12	0.05
Under contoured margin	6	
Unacceptable color match	8	
Total	26	

Table II, graph I shows that esthetic causes were over contoured margin in 12, under contoured margin in 6 and unacceptable color match in 8 cases. The difference was significant ($P < 0.05$).

Graph I Esthetic causes of failures

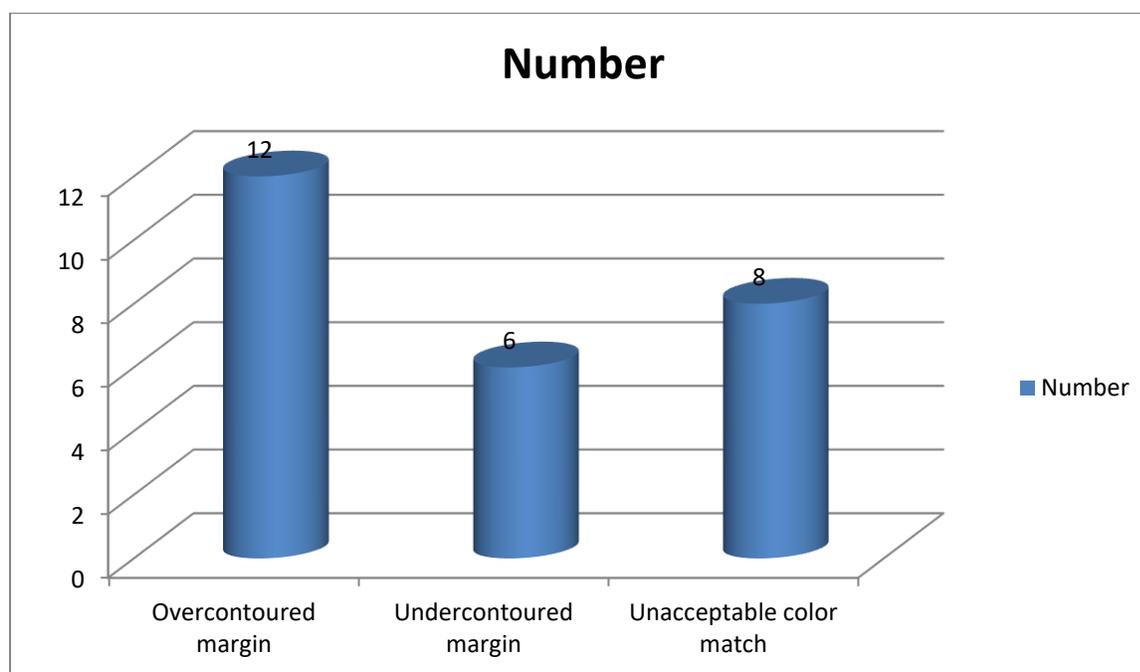


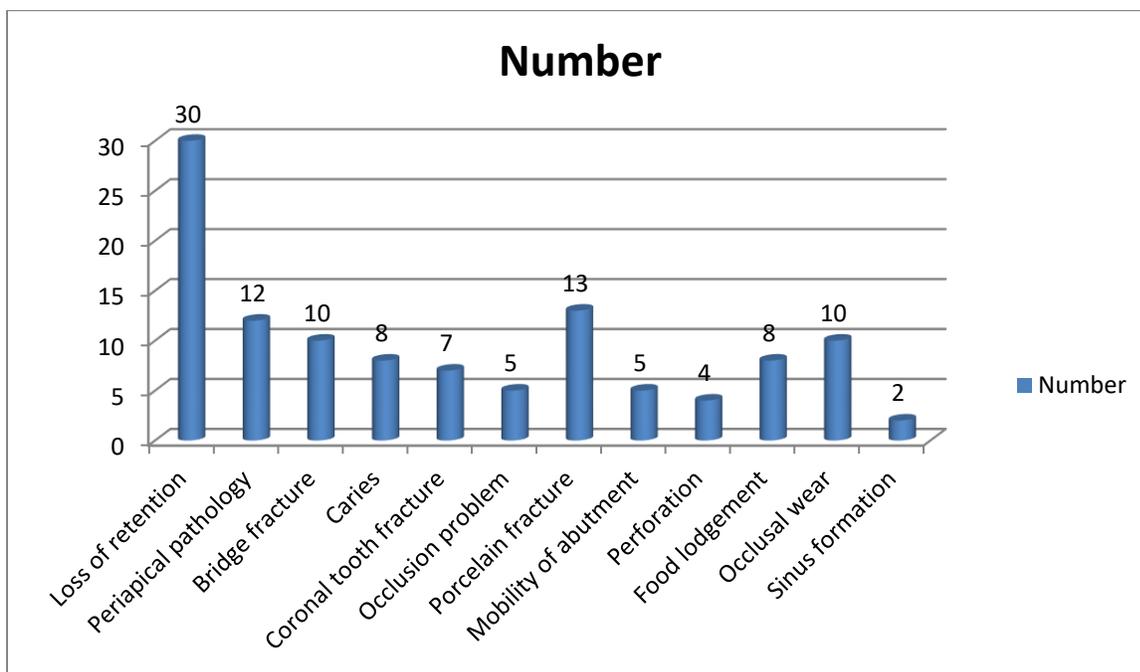
Table III Other causes of failures

Other failure	Number	P value
Loss of retention	30	0.01
Periapical pathology	12	
Bridge fracture	10	

Caries	8	
Coronal tooth fracture	7	
Occlusion problem	5	
Porcelain fracture	13	
Mobility of abutment	5	
Perforation	4	
Food lodgement	8	
Occlusal wear	10	
Sinus formation	2	
Total	114	

Table II, graph I shows that other causes of failures was loss of retention in 30, periapical pathology in 12, bridge fracture in 10, caries in 8, coronal tooth fracture in 7, occlusion problem in 5, porcelain fracture in 13, mobility of abutment in 5, perforation in 4, food lodgement in 8, occlusal wear in 10 and sinus formation in 2 cases. The difference was significant ($P < 0.05$).

Graph II Other causes of failures



Discussion

All-ceramic fixed partial dentures (FPDs) have been routinely used in clinical dentistry because various all-ceramic materials have been introduced and available for a clinical use. Favorable

clinical performance for all-ceramic systems, has been reported especially when they are used in the anterior region. Clinical follow-up studies of patients treated with artificial crowns and fixed partial dentures (FPD) (bridges) is mandatory to find out complications. Reports are extremely valuable for the overall assessment of various factors considered significant to the longevity of different restorations.^{7,8} The present study was conducted to assess causes of failures of FPD.

In present study, out of 142 patients, males were 82 and females were 60. Sajjan et al⁹ in their study, a total of 158 patients were selected with complaints related to fixed dental prosthesis (FDP). Site and condition of the prosthesis and its abutments were evaluated. Majority of failures (32.27%) were found to be class III failure followed by class VI failure (24.05 %). 13.29 % failures were Class IV, 12.65 % failures were identified as class II, 12.02 % failures as class V and 5.69 % failures were categorized in class I failure.

We observed that esthetic causes were over contoured margin in 12, under contoured margin in 6 and unacceptable color match in 8 cases. In a study by Fayyad et al¹⁰, 75 patients contributing a total of 309 units were included. Qualities of the present fixed partial dentures were clinically and radiographically assessed. The results showed most common complication was shade mismatch 64%, over-contoured 59.9%, open margins 49.8% and caries 40.1%. The number of units and duration of service were found to influence most of the assessed complications. The prevalence of complications was high among the studied sample.

We observed that other causes of failures was loss of retention in 30, periapical pathology in 12, bridge fracture in 10, caries in 8, coronal tooth fracture in 7, occlusion problem in 5, porcelain fracture in 13, mobility of abutment in 5, perforation in 4, food lodgement in 8, occlusal wear in 10 and sinus formation in 2 cases. Rashedi¹¹ in their study included 98 patients, with 44 FPD and 54 single crowns. Patients were asked questions pertained to the period, nature of complaint, and type of materials used. Clinical examination was performed. The percentage of the failures were periodontal disease (51%), gingival bleeding (46.9%), open margins (43%), caries (41%), shade mismatch (42%), occlusal wear of the opposing tooth (20.4%) prostheses loose (13%) and porcelain or abutment fracture (12.2%). The duration of service was found to influence most of the assessed complications especially periodontal disease, shade mismatch and occlusal wear.

Ericson et al¹² contend the lifespan of a FPD is correlated with the number of retainers but not with the number of units. This study found a decrease in the mean years of service as the number of units in a FPDs increased. The mean year of service for a three-unit FPD was 8.6 years and just 4.2 years for a six-unit FPD. In a study by Zavanelli et al¹³ the patients answered a questionnaire about the satisfaction degree with dental treatment performed and care maintenance for prosthesis conservation. Clinical and radiographic evaluations of the prosthesis were performed. A total of 9.67% failures were found. The most common was the prosthesis loosening (57.14%), followed by ceramic fracture (28.57%), and abutment tooth fracture (14.29%). Biological failures were observed in 30.65%. The most common failure was gingival recession (52.00%), periodontal pocket (24.00%), support periodontal involvement (16.00%),

and recurrent caries (4.00%). Radiographic examination showed that 70.97% of the total number evaluated had some kind of failure. There was statistically significant association between satisfaction degree and technical failure ($p=0.04$).

Chandranaik et al¹⁴ in their study a total of 450 fixed partial denture failures in subjects were assessed. The fixed partial denture was examined for the failure factors (biological, mechanical, and esthetic). Out of 450 fixed partial denture failures, 33.3% of it showed the biological failure, 55.1% showed the mechanical failure and 11.5% showed esthetic failure. The most frequent reason for failure was mechanical factors followed by biological and esthetic failure factors. The caries was the most common biological failure factor, the loss of retention was the most common cause of mechanical failure factor and the unacceptable color match was accounted more when compared to other esthetic failure factors.

The limitation of the study is small sample size.

Conclusion

Authors found that common cause of failures was under contoured, over contoured margin, loss of retention and periapical pathology.

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