

Original Research

Evaluation of causes of failures of fixed partial denture

¹Farhat Jabeen, ²Yamini Ruthwal, ³Kusha Thakur

¹Senior Lecturer, Institute of Dental Sciences, Seorah, Jammu, Jammu and Kashmir, India;

²Senior Lecturer, Himachal Dental College, Sundernagar, HP, India;

³Private Practitioner, Una, India

ABSTRACT:

Background: Fixed partial dentures (FPDs) failure can occur in many ways. The present study was conducted to evaluate causes of failures of fixed partial denture. **Materials & Methods:** 86 cases of fixed partial denture were enrolled and the causes of FPD was recorded. **Results:** Out of 86 patients, males were 40 and females were 46. Out of 86 cases, 20 (23.2%) showed FPD failure rate. Common causes of FPD failures were under-contoured margin in 2, over-contoured margin in 1 and unacceptable colour match in 2, loss of retention in 4, bridge fracture in 2, coronal tooth fracture in 1, porcelain fracture in 1, occlusal wear in 2, caries in 1, periapical pathology in 2, tender on percussion in 1, tenderness on bite in 1 and sinus opening in 1 case. The difference was significant ($P < 0.05$). **Conclusion:** Most common causes of FPD failures were under-contoured margin, over-contoured margin, unacceptable colour match, loss of retention, bridge fracture, occlusal wear and periapical pathology.

Key words: loss of retention, bridge fracture, Fixed partial dentures

Received: 21 February, 2022

Accepted: 24 March, 2022

Corresponding author: Kusha Thakur, Private Practitioner, Una, India

This article may be cited as: Jabeen F, Ruthwal Y, Thakur K. Evaluation of causes of failures of fixed partial denture. J Adv Med Dent Res 2022;10(4):140-143.

INTRODUCTION

Fixed partial dentures (FPDs) have been the treatment of choice for the replacement of missing teeth for some years.¹ Edentulism and dental disease have been shown to affect patients adversely. Patients with the dental disease suffer from an altered self-image. They may be expected by others to be socially less competent and have less intellectual achievement.²

Failure of the fixed prosthesis can occur in many ways. The reasons for failure may be divided into biological failures, mechanical failures, and aesthetic failures.³ Mechanical failures are more directly under the influence of the clinician. Biological problems are less easily controlled and in some instance may be unrelated to the treatment or prosthesis.⁴

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.⁵ Failure of these restorations may also lead to recurrent caries or loss of abutment teeth. Complications resulting from rehabilitation treatment with prostheses are factors that may occur during or after

treatment.⁶ 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.⁷ The present study was conducted to evaluate causes of failures of fixed partial denture.

MATERIALS & METHODS

The present study comprised of 86 patients of fixed partial dentures of both genders. All gave their written consent for the active participation in the study.

Data such as name, age, gender etc. was recorded. A thorough oral examination was performed. Parameters such as the type of material, the type of pontic design, dental caries, tender on percussion, food lodgement, periapical pathology, mobility in abutment, occlusal problem, unacceptable color match etc. 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- 86		
Gender	Males	Females
Number	40	46

Table I shows that out of 86 patients, males were 40 and females were 46.

Table II Prevalence of FPD failures

Total cases	Failure	Percentage
86	20	23.2%

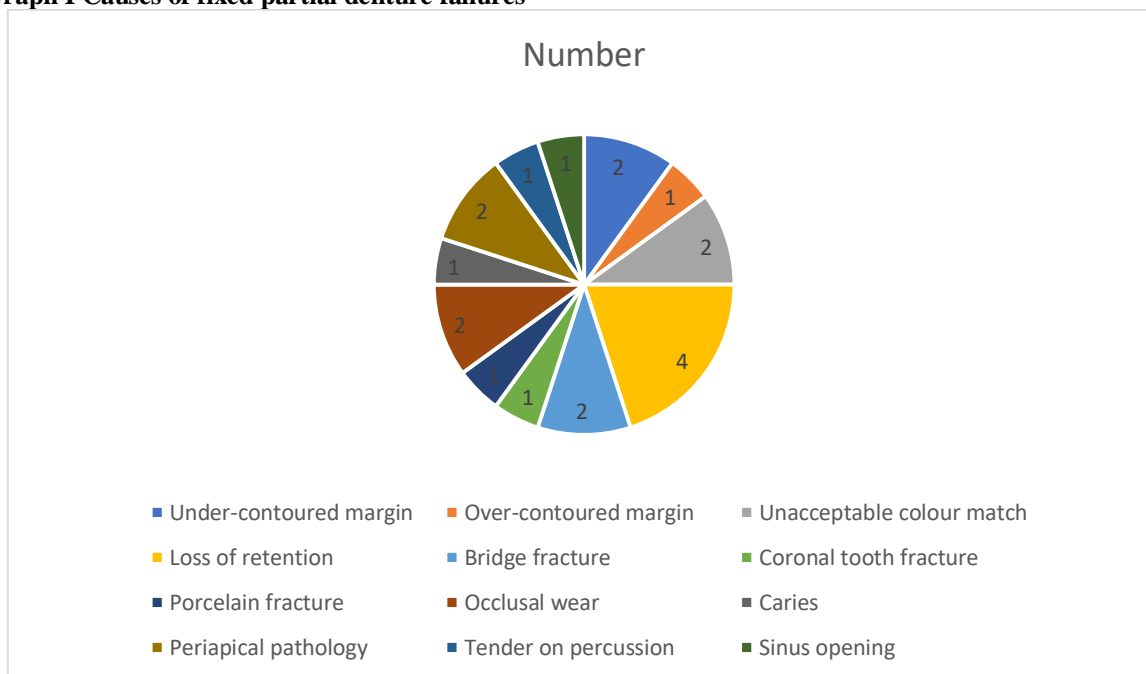
Table II shows that out of 86 cases, 20 (23.2%) showed FPD failure rate.

Table III Causes of fixed partial denture failures

Parameters	Number	P value
Under-contoured margin	2	0.05
Over-contoured margin	1	
Unacceptable colour match	2	
Loss of retention	4	0.01
Bridge fracture	2	
Coronal tooth fracture	1	
Porcelain fracture	1	
Occlusal wear	2	0.03
Caries	1	
Periapical pathology	2	
Tender on percussion	1	
Sinus opening	1	

Table II, graph I shows that common causes of FPD failures were under-contoured margin in 2, over-contoured margin in 1 and unacceptable colour match in 2, loss of retention in 4, bridge fracture in 2, coronal tooth fracture in 1, porcelain fracture in 1, occlusal wear in 2, caries in 1, periapical pathology in 2, tender on percussion in 1, tenderness on bite in 1 and sinus opening in 1 case. The difference was significant ($P < 0.05$).

Graph I Causes of fixed partial denture failures



DISCUSSION

Replacement of missing teeth in partially edentulous arch involves various treatment options like removable, fixed prosthesis, and implants.^{8,9} Fixed

prosthodontic treatment can offer exceptional satisfaction for both patient and dentist.¹⁰ 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.^{11,12} Knowledge regarding the clinical complications that can occur in fixed prosthodontics enhances the clinician's ability to complete a thorough diagnosis and to develop the most appropriate treatment plan.¹³ The present study was conducted to evaluate causes of failures of fixed partial denture.

We found that out of 86 patients, males were 40 and females were 46. Patel et al¹⁴ enrolled 142 patients of both genders who had FPD failures due to various reasons. The cause of failure was recorded. Aesthetic causes were over contoured margin in 12, under contoured margin in 6 and unacceptable colour match in 8 cases. Other causes of failures were 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.

We observed that out of 86 cases, 20 (23.2%) showed FPD failure rate. Rashedi et al¹⁵ 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.

We found that common causes of FPD failures were under-contoured margin in 2, over-contoured margin in 1 and unacceptable colour match in 2, loss of retention in 4, bridge fracture in 2, coronal tooth fracture in 1, porcelain fracture in 1, occlusal wear in 2, caries in 1, periapical pathology in 2, tender on percussion in 1, tenderness on bite in 1 and sinus opening in 1 case. Sheikh et al¹⁶ assessed causes of failures of FPD. 142 patients of both genders who had FPD failures due to various reasons were included. The cause of failure was recorded. Esthetic causes were over contoured margin in 12, under contoured margin in 6 and unacceptable color match in 8 cases. Other causes of failures were 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 ($P < 0.05$). Common cause of failures was under contoured, over contoured margin, loss of retention and periapical pathology.

Geibala et al¹⁷ found that 84% of the patients were satisfied with their fixed prosthesis, while only 46.4% of patients were satisfied with the chewing ability. In concern, with aesthetic outcome, 80% of patients showed that they were satisfied with the aesthetic. The results showed that a high significantly number of patients did not use any form of interdental aids' to clean their fixed prosthesis (94%). The main reason for not using any dental aids' (91.1%) was a lack of post fixed prosthodontics instructions and not been informed by the dentist.

The drawback of present study is small sample size and short follow up.

CONCLUSION

Authors found that common causes of FPD failures were under-contoured margin, over-contoured margin, unacceptable colour match, loss of retention, bridge fracture, occlusal wear and periapical pathology.

REFERENCES

1. Carlson BR, Yontchev E, et al. Extensive fixed partial dentures on mandibular canine teeth: a 5-year recall study. *Int J Prosthodont* 1989;2:265-271.
2. Cheung GS, Dimmer A, et al. A clinical evaluation of conventional bridgework. *J Oral Rehabil* 1990;17:131-136.
3. Sajan, Eschen S, De Haan AF, Van't Hof MA. An evaluation of crowns and bridges in a general dental practice. *J Oral Rehabil*. 1985;12(6):515-28.
4. Fayyad MA, Nilson H, Bergman B. Cross-sectional study of patients fitted with fixed partial dentures with special reference to the caries situation. *Scand J Dent Res* 1990;98(1):8-16.
5. Karlson S. A clinical evaluation of fixed bridges: 10 years following insertion. *J Oral Rehab* 1986;13:423-432.
6. Randow K, Glantz PO. Technical failures and some related clinical complications in extensive fixed prosthodontics. *Acta Odontol Scand* 1986;44:241-255.
7. Foster LV. Failed conventional bridgework from general dental practice: clinical aspects and treatment needs of 142 cases. *Br Dent J* 1990;168:199-201.
8. Glantz POJ, Nilner K, et al. Quality of fixed prosthodontics after 15 years, *Acta Odontol Scand* 1993;51(4):247-252.
9. Reuter JE, Brose MO. Failures in full crown retained dental bridges. *Br Dent J* 1984;157:61-63.
10. Rashedi. A sanitary "arc-fixed partial denture": Concept and technique of pontic design. *J Prosthet Dent*. 1983;50(3):338-41.
11. Ericson, al-Rafee MA. Failure of dental bridges. II. Prevalence of failure and its relation to place of construction. *J Oral Rehabil*. 1996;23(6):438-40.
12. Zavanelli AC, Mazaro JV, Nóbrega PI, Falcón-antenucc RM, Zavanelli RA. Data collection about failures in fixed partial dentures: 1-year monitoring. *RGO-Revista Gaúcha de Odontologia*. 2018 Sep;66(3):250-6.
13. Chandranaiik MB, Thippanna RK. Fixed Partial Denture Failures: A Clinical Survey for Evaluation of the Factors Responsible. *CODS J Dent* 2017;9(2):41-45.

14. Patel et al. Assessment Of Causes Of Failures Of Fixed Partial Denture. *European Journal of Molecular & Clinical Medicine* 2020; 2920-26.
15. Rashedi. A sanitary "arc-fixed partial denture": Concept and technique of pontic design. *J Prosthet Dent.* 1983;50(3):338-41.
16. Sheikh E, Ghatekari S, Patel R, Patel M, Sharma P, Tippadampally S. Assessment Of Causes Of Failures Of Fixed Partial Denture. *European Journal of Molecular & Clinical Medicine.* 2021 Jan 7;7(11):2920-6.
17. Geiballa GH, Abubakr NH, Ibrahim YE. Patients' satisfaction and maintenance of fixed partial denture. *European journal of dentistry.* 2016 Apr;10(02):250-3.