

ORIGINAL ARTICLE

A Clinical Study to Assess the Reasons for Crown or FDP Failures

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ABSTRACT

Aims: The aim of the study was to assess the probable reasons for crown/fixed dental prosthesis (FDP) failure.

Objectives: The objective of the study was to diagnose and prevent the reasons for crown FDP failure and to educate and to motivate the patients about the importance of maintenance of their FDP.

Materials and Methods: A cross-sectional study was conducted among 255 patients that attended the OPD of School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, with a chief complaint of failures related to crown or FDP.

Results: This study shows that the two main causes of failures were loss of retention and caries. Failures had a correlation with a number of years the prosthesis that had been in service.

Conclusions: A proper post cementation care is very important in preventing failures related to crown and FDPs along with proper diagnosis and treatment planning which adhere to the basic principles of tooth preparation which is more than overlooked.

Key words: Bridges, Crowns, Dental, Failure, Prosthesis

How to cite this article: Patankar RC, Ramaswamy S, Mhatre TC, Guru RC. A Clinical Study to Assess the Reasons for Crown or FDP Failures. *Int J Med Oral Res* 2018;3(1):22-25.

Source of support: Nil

Conflicts of interest: None

INTRODUCTION

Tooth loss or missing teeth are caused due to various reasons such as periodontal, pulpal, congenital, trauma,

and also due to old age.^[1] The awareness of replacement of missing/lost teeth with the help of fixed prosthesis is increasing rapidly.^[2] In such cases fixed prosthesis offers an extraordinary function for retention, stability, and patients comfort; hence, their demand and practice are increasing.^[3]

Fixed type of retention is offered by both implants and crown or fixed partial dentures.^[4] Since crowns/ fixed dental prosthesis (FDP) are cost-efficient compared to the more expensive option of the implants, they are often demanded. Along with their ever-increasing demand for fixed prosthesis, their failures are also common.^[3] A failure has been defined as the state or condition of not meeting a desirable or intended objective and may be viewed as the opposite of success. Fixed prosthodontic failures can be complex in terms of both diagnosis and treatment.^[5] Some of the different reasons for failure may include secondary caries, over contouring of the restoration, and PDL breakdown, knowledge about the same is very important in clinical practice.^[2,6] They were broadly classified into three groups, namely: (1) Biological, (2) mechanical, and (3) esthetical.^[7]

Although the literature^[1,6,8,9] provide detailed knowledge about the numerous reasons of failure but a few studies provide reasons of failure associated with the type and materials of fixed prosthesis.^[2,10,11]

Oginni^[12] described the failures related to FDPs in Nigerian population. Such a study has not been done in this population; hence, a study is done to assess the reasons for crown/FDP failure as knowing them will help to diagnose/prevent them.

MATERIALS AND METHODS

A cross-sectional clinical study to assess the reasons for a crown or FDP failure was conducted among the patients visiting the OPD of Department of Prosthodontics for a period of 6 months from January 2017 to June 2017 at S.D.S., K.I.M.S.D.U., Karad. Ethical approval for carrying out the present study was obtained from Research Ethics committee of Krishna Institute of Medical and Dental Sciences Karad, Maharashtra, India. A convenient sampling technique was applied, and the sample size was drawn as 255. Consented patients with a chief complaint of dislodged crown or FDP or Post and Core restorations, mobility of the tooth or the prosthesis,

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pain, discomfort, food lodgement or foul smell associated with the prosthesis were considered for the study. Patients seeking crown/FDP for the first time, patients seeking/with existing CD/RPD/implant-supported dental prosthesis/maxillofacial prosthesis were excluded from the study. The purpose of the study was explained to each and every patient in their mother tongue. Eight experts from the field of prosthodontics were approached to review the questionnaire for its face and content validity. A careful clinical evaluation was done, and the questionnaire [Appendix 1] was divided into two sections, i.e. Section 1 which was about the patients' chief complaint and condition of the prosthesis in question and contains five questions from 1 to 5. Whereas, Section 2 was about the clinical assessment of the prosthesis in question which contains seven questions from 1 to 7. The questionnaire was handed over to the patients for them to answer. The questionnaires were translated into the local language and back-translated into English by a bilingual expert and validated. The answers were marked by a single subject expert. The compiled data were entered into the excel sheet (Microsoft Excel 2007). The statistical analysis was done by descriptive statistics (mean and standard deviation) method using Statistical Package for the Social Sciences software version 17.

RESULTS

Figures 1-4 and Table 1 show the result representation of the details of the chief complaints of failures of the prosthesis of the participants; the graph corresponds to the questions in the questionnaire [Appendix 1].

When subjectively evaluated by a single operator, the age details of the participants of the study with a total number of participants are 255(N) and with a mean age of 40.17(N). Figure 1 describes the gender details of the participants of the study with male participants 125(N) (49%) and females 130(N) (51%).

In section 1 of Appendix 1, patients chief complaint and related information were recorded of which question 1 describes that maximum participants (i.e. 74(N) - 29%) had their teeth prosthetically restored about 1–2 years back and the minimum number of participants (i.e. 51[N] - 20%) had their teeth restored more than 5 years back. Figure 2 corresponds to question 2 in Section 1 which describes the reason for restoration with the chief complaint. 193(N) -75.7% (i.e. maximum participants) said the reason was caries; only 12(N) -4.7% gave other reasons such as mobility and periodontal reasons. Of the total participants, 51.8% said that they have got the prosthesis done from private clinics, whereas 48.2% had done in School of Dental Sciences. 80% of the participants were satisfied whereas 20% were not

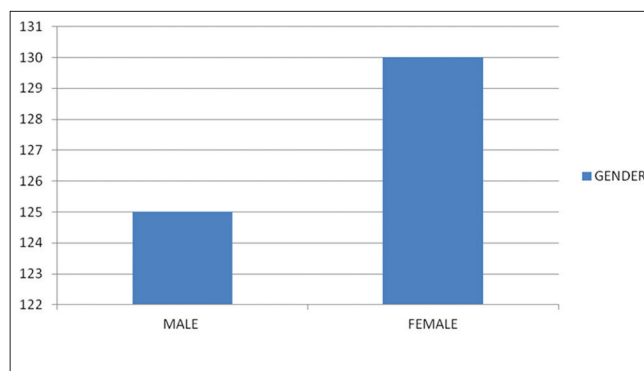


Figure 1: Gender-wise distribution among study

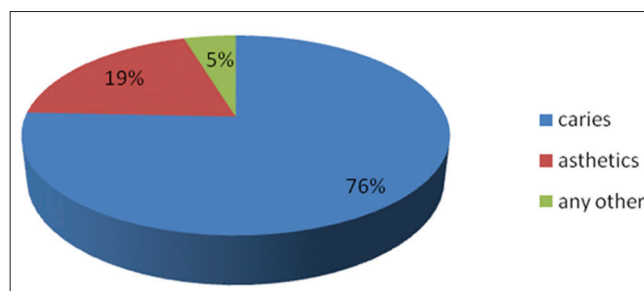


Figure 2: Why was it restored?

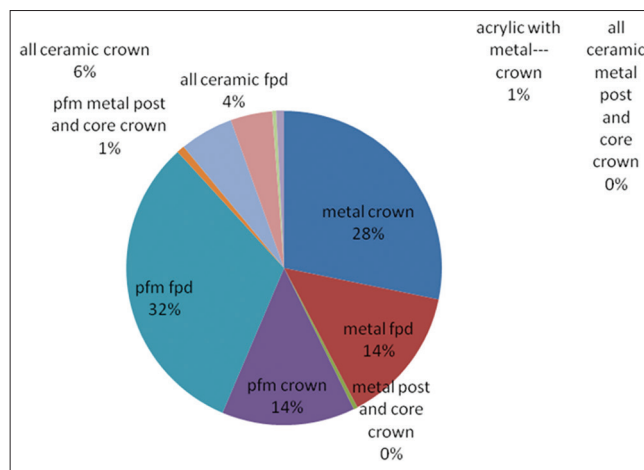


Figure 3: Type of prosthesis. Only 2% population have more than 1 type of prosthesis remaining 98% type have a mixed type of prosthesis

satisfied with the prosthesis back then when the tooth was restored. The 5th question asks about the problem with the prosthesis now, 58.8% (maximum) had said dislodgement, and only 11% (minimum) said caries was the problem.

Section 2, describes the clinical assessment of the prosthesis described as the chief complaint. 59.6% of people had abutment teeth which were clinically in good condition in terms of caries, and 40.4% had poor condition of abutment tooth. 62% had multiple FDP in their oral cavity and 38% had only one FDP. 10.2% of the

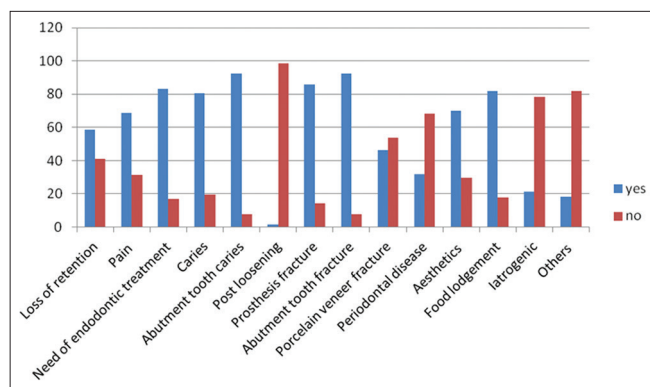


Figure 4: All the reply for sub-questions (existing problem with the prosthesis)

Table 1: Gender* abutment tooth caries

Crosstab				
Gender	Abutment tooth caries		Total	P
	Yes	No		
Male				
Count	120	5	125	0.034
% Within gender	96.0	4.0	100.0	
% Within abutment tooth caries	51.1	25.0	49.0	
% Of total	47.1	2.0	49.0	
Female				
Count	115	15	130	0.034
% Within gender	88.5	11.5	100.0	
% Within abutment tooth caries	48.9	75.0	51.0	
% Of total	45.1	5.9	51.0	
Total				
Count	235	20	255	
% Within gender	92.2%	7.8%	100.0%	
% Within abutment tooth caries	100.0%	100.0%	100.0%	
% Of total	92.2%	7.8%	100.0%	

participants had more than 2 FDP present other than the one with chief complaint and participants with no prosthesis other than prosthesis with chief complaint were 38%. The condition of other fixed prosthesis was good in 137(N) participants, i.e. 53.7% and poor in 21(N) participants, i.e. 8.2%. The condition of abutment of other prosthesis was good in 146(N), i.e. 57.3% and poor in 12(N), i.e. 4.7% participants.

In Section 2, question 6 corresponds to Figure 3 which was about the type of prosthesis with a chief complaint that describes that 31.8% (maximum) participants had porcelain fused metal FDP whereas only 0.4% (minimum) had all metal post and core FDP and all ceramic post and core FDP both. In Section 2, question 7 corresponds to Figure 4 describes the problem with the existing prosthesis. Of 255 participants, 58.8%

participant said yes for loss of retention, 68.6% said yes for pain, 83.1% had a need for endodontic treatment, 80.4% had caries, 92.2% had abutment tooth caries, 1.56% had post loosening, 85.9% had prosthesis fracture, 92.5% had abutment tooth fracture, 46.2% had porcelain veneer fracture, 31.7% had periodontal disease, 70.1% had aesthetic problems, 82% had food lodgement, 21.5% and 18.1% had iatrogenic, and other problems, respectively. Table 1 shows that after comparing gender with each of the subcategories of question 7, statistically significant results were obtained for abutment tooth caries ($P = 0.034$). The results also show that males have more abutment tooth caries as compared to females.

DISCUSSION

Fixed partial dentures have been extensively used in the replacement of missing single or multiple teeth^[2,13] with materials such as metal, all ceramic, resin bonded, or porcelain fused metal prosthesis.^[14,15]

In this study, 51% of females had failures related to fixed partial dentures which are more as compared to males. Furthermore, the incidence of caries was not related to the age of the patient, rather, to the time that the prosthesis had functioned.^[16,17]

The most common reason for restoration by FDP was given as extensive caries by 76% of the total participants in this study. To maintain occlusion and proper function the teeth had to be restored by fixed prosthesis as they do not require extraction of the infected teeth for the restoration of functions, unlike removable dental prosthesis.^[18] Goodacre *et al.*^[19], Foster,^[20] Napankangas *et al.*,^[21] and Cheung *et al.*^[22] reported pulp pathology as a major reason for the failure of FDPs.

Although 80% of the total participants in this study were satisfied with the restored prosthesis then, had complains of failure now. This may be due to lack of patient's knowledge or failure to follow the instructions given by the dentist about the maintenance of the prosthesis.^[23] However, both Schwartz *et al.*^[24] and Randow *et al.*^[25] reported caries to be the most frequent cause of failure of existing fixed restorations (36% and 18.3%).^[26]

The most prevalent problem with the existing prosthesis in this study is 92.2% had abutment tooth caries. In this study, statistically significant results were obtained after comparing gender with abutment tooth caries ($P = 0.034$). Males had more abutment tooth caries than that of females.

CONCLUSIONS

Fixed type of prosthesis such as crowns and bridges has been proven very efficient in case of patient compliance and cost-effective for the replacement of missing or

extensively decayed tooth after endodontic treatment.^[2] In this study, major causes for failure were shown. To avoid these failures, a thorough case history should be taken. Proper diagnosis and treatment planning play a key role in avoiding such failures.^[27] For the management of these failures, proper investigation for the cause of failure should be done, repair or removal followed by replacement with the same or different type of material should be done after proper evaluation of the problem.^[10,25] Through this study, it can be concluded that proper post-operative care and post cementation education and awareness of the patient along with frequent follow-ups including follow-up radiographs are equally important in avoiding fixed prosthetic failures.

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