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DENTAL PROSTHESIS;

ASSESSMENT OF GRADES OF FAILURES OF CONVENTIONAL FIXED DENTAL PROSTHESIS BASED ON SEVERITY

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ABSTRACT… Introduction: Fixed dental prostheses (FDPs) are still preferred owing to their durability, esthetics, cost-effectiveness, adequate retention and lack of a surgical procedure. These restorations generally demonstrate longer life and durability in clinical service. Despite the high survival rates, FDP complications are frequently encountered. Although several studies have reported on complications associated with FDPs, there is a lack of a standard and universal reporting system for FDP failures. **Objectives:** To evaluate FDP failures using an easy classification scheme relevant to all conventional FDP failures. To assess the prevalence of FDP failures based on this system. **Study Design:** Cross-sectional study. **Setting:** Margalla Institute of Health Sciences (MIHS), Rawalpindi. **Period:** From 20th July 2014 to 20th January 2015. **Materials and Methods:** Subjects reporting to the outpatient department with complaints of failed crowns or bridges were included in the study. FDP failures were classified according to Manappallil's classification. Data was analyzed using SPSS version 24. Descriptive statistics were calculated. **Results:** Majority (31.6%) of the FDP failures were classified as Class I failures while the second most common FDP failures belonged to Class IV with a prevalence of 30.1%. Majority of the study subjects had been wearing FDPs for a period of 2 – 5 years while a few (2%) reported a history of use of FDP for more than 15 years. **Conclusion:** Class I failures are the most prevalent failures in FPDs.

Key words: Crowns, Dental Restoration Failure, Fixed Dental Prosthesis, Metal-Ceramic.

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INTRODUCTION

Rehabilitation of oral function using fixed prosthesis has greatly increased over the last thirty years.[1] Fixed prosthodontic treatment involves replacement of lost natural teeth using fixed artificial substitutes with an aim to restore function, esthetics and comfort.[2] Although the preparation of healthy abutment teeth makes them less desirable[3], fixed dental prostheses (FDPs) are still preferred because of their strength, esthetics, less cost, satisfactory retention and lack of any surgical preparation.[4]

Over the years, the success and survival of FDPs has been estimated and reported. These restorations generally demonstrate longer life and durability in clinical service. In a retrospective study, Eliasson et al.[5] reported survival rates of 98%, 97% and 85% after 5, 10 and 15 years of use for fixed dental prosthesis. In a similar study in Japan on FDPs, a survival rate of 74% after 15 years of service was reported.[6]

Like all other dental restorations, FDPs are liable to failure. Despite the high survival rates, FDP complications are frequently encountered. FDP failures are a multi-factorial phenomenon and the failure can be attributed to several different factors.[1] Complications can be categorized as biological such as caries, pulpal pathologies and periodontal issues or technical problems like decementation, ceramic chip-off, aesthetic failures or fractures.[7] A few authors attribute these failures to a lack of clinician's skill, faulty technique or poor material choice.[8] Good acre et al.[9] carried out a retrospective analysis and calculated a 27% mean rate of complications in fixed dental prosthesis over a period of 5 - 14 years. Evaluating FDP complications in the local population, Ghani and Memon[10] reported a 46%

Class of FDP Failure	Description
Class I	Failure can be corrected without a need to replace the prosthesis
Class II	Failure can be corrected without replacing prosthesis but abutments require restoration
Class III	Failure requires renewal of the prosthesis; abutment teeth/foundation restoration are acceptable
Class IV	Failure requires replacement of FDP along with repair of abutment teeth/foundation restoration
Class V	Extensive failure with loss of abutment teeth or an incapacity to rehabilitate original tooth structure. Treatment with FDP is possible by redesigning the prosthesis and using additional teeth for support and retention.
Class VI	Extensive failure with loss of abutment teeth or an incapacity to rehabilitate original tooth structure. Treatment with conventional FDP is not possible

Table-I. Classification of FDP failures based on the degree of severity and possible rehabilitation[12]

complication incidence in prostheses placed for more than 5 years.

Despite several studies reporting on complications associated with FDPs, there is a lack of a standard and universal reporting system for FDP failures.[11] The need to follow a system to classify FDP failures cannot be overemphasized. This will help differentiate between failures resulting due to poor patient care and those attributable to faulty design or insufficient clinical or laboratory preparation as well as highlight the need and degree of replacement required.[2] The aim of this article is to evaluate FDP failures using an easy classification scheme that can be applied to all fixed prosthodontic failures and to assess the prevalence of FDP failures based on this system. The knowledge will help the clinician to establish a diagnosis and suggest a corresponding effective treatment plan.

METHODOLOGY

A cross-sectional study was designed and conducted at Margalla Institute of Health Sciences (MIHS), Rawalpindi from 20th July 2014 to 20th January 2015. Based on previously published data[2], a sample size of 345 was calculated using WHO sample size calculator with anticipated population proportion (P) at 0.323, absolute precision (d) at 0.05 and confidence level (1-α) at 95%. Subjects reporting to the outpatient department with complaints of failed crowns or bridges were included in the study and an informed consent was obtained from each patient. A self-administered proforma was used to collect information regarding crown and bridges like duration, no. of fixed dental prostheses and teeth having fixed prostheses as well as demographic data of the patient. Performa's were filled under the supervision of prosthodontist. FDP failures were classified according to Manappallil's classification which divides all FDP failures into six classes (Table-I).[12] Data was analyzed using SPSS version 24. Descriptive statistics were calculated. Frequency of occurrence of each class of failure was assessed.

RESULTS

Of the 345 patients, 194 (56.2%) subjects were males and 151 (43.8%) were females. Patients ranged in age from 19 to 72 years with a mean age of 45.5 ± 12.42 years. Majority of the study subjects had been wearing FDPs for a period of 2 – 5 years while a few (2%) reported a history of use of FDP for more than 15 years (Table-II). The number of fixed prostheses varied from 01 (single crowns) to 14-unit long spans, with the single unit FDPs being the most common (21.7%) (Table-III). Majority (31.6%) of the FDP failures were classified as Class I failures (Figure-1) while the second most common FDP failures belonged to Class IV with a prevalence of 30.1%.

Duration of Use (Years)	Frequency (%)
< 1 year	21.4
1 year	20.3
2 – 5 years	33.4
6 – 10 years	20.9
11 – 15 years	02
> 15 years	02

Table-II. Duration of prosthesis use

Number of FDPs	Frequency (n)	Percent (%)
01 unit FDP	75	21.7
02 unit FDP	33	9.6
03 unit FDP	51	14.8
4 – 6 unit FDP	73	21.2
8 – 10 unit FDP	66	19.1
11 – 14 unit FDP	47	13.6
Total	345	100

Table-III. Number of FDPs worn by study subjects

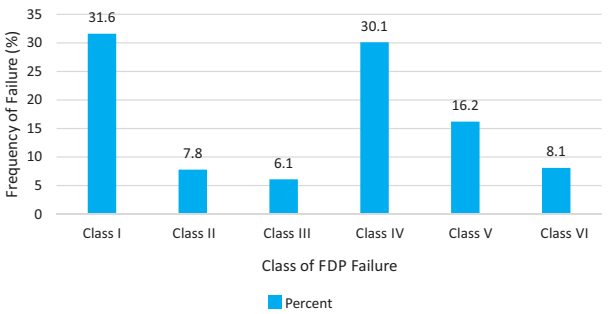

Figure-1. Frequency of FDP failures among study subjects

DISCUSSION

Rehabilitation of teeth with a fixed prosthesis, in contrast to a removable one, is greatly preferred by the patients. This has resulted in an increased number of crowns and bridges being placed over the last thirty years.[1] Consequently, number of patients returning with complaints about or failures of fixed prsotheses has also amplified. Clinicians face the difficulty of quantifying and classifying FDP failures since the definition of failure in literature used by different researchers is quite variable.[8] The present study aimed to utilize, and thereby endorse, a simple and easy classification of FDP failures relevant to all conventional FDP failures.

In the present study, majority (31.6%) patients presented with Class I FDP failures. These include situations where failure is correctable without a need to replace the restoration such as a loss of luting cement bond or loss of occlusal contact. While such a failure may result due to faulty cementation technique or faulty fabrication, decementation of an otherwise perfect crown or bridge usually occurs due to the use of sticky foods by the patient. In contrast, Shah et al.[2] in their study found Class III failures to be the most prevalent ones while the prevalence of Class I failures was only 5.69%. Class III failures included failed restorations due to defective margins, poor esthetics or technical issues. Such failures are attributable to negligence on part of the dentist or the technician.

The second most common failures of FDPs in the present study were Class IV failures (30.1%) i.e. failures that require replacement of the prosthesis along with the repair of the foundation restoration and/or tooth structure. Common complications leading to such failures include need for endodontic treatment, fracture of the foundation restoration, loosening of posts and caries. Of all these, endodontic complications are the most prevalent one for single crowns while endodontic complications for fixed partial dentures.[9] Shah et al.[2], on the other hand, reported a 13.29% prevalence of Class IV failures.

Considering the cohort selected for the present study, the highest number of patients (33.4%) returned with complications after a period of 2 – 5 years. This includes patients with single crowns and/or fixed partial dentures. This incidence of complications in FDPs is comparable to that reported by Goodacre et al.[9] He found a mean complication incidence of 27% for fixed partial dentures and 11% for single crowns. In contrast to these findings, Ghani and Memon[10] reported an incidence of 46% complications of varying levels ocuring in FDPs that had been placed for 5 years or less. This difference, however, can be explained on the basis of a different classification system being used to evaluate the complications and failures. Such inconsistencies in research findings can only be overcome by using a simple and standardized system for classifying restoration failures.[11]

While the present study gains strength by utilizing a simple classification system of FDP failure applicable to all situations, it has its own share of weaknesses. First, all patients presenting to the OPD with complaints or failures of FDP were selected irrespetive of where they got their restorations from. Therefore, patients who had had treatment from quacks were also included. Secondly, FDPs included both single crowns and fixed partial dentures and a differentiation between the two was not specified. Third, since questions related to the history of use relied on a patient's memory and reporting, some element of "recall bias" existed and could not be avoided. Also, since only failures or complication have been evaluated, effect of factors such as gender, age or expertise of the treating dentist on the success

and survival of FDPs could not be evaluated. It is, therefore, suggested that similar studies with a larger sample size and prospective design may be carried out for better statistical findings.

Despite advances in dentistry and availability of newer materials, fixed dental prosthesis especially those of metal – ceramic are still the "gold standard" in prosthodontics.[1,13] Failure of such restorations is a complex phenomenon and can be simplified by the use of a simple classification system. A clinician must be familiar with all possible factors affecting a restoration's success. Proper planning and execution of treatment minimizes complications and ensures restoration longevity.

CONCLUSION

Based on the findings of this study, the following conclusions can be drawn:

i. Majority (31.6%) of the FDP failures were classified as Class I failures while the second most common FDP failures belonged to Class IV with a prevalence of 30.1%.
ii. Majority of the study subjects had been wearing FDPs for a period of 2 – 5 years while a few (2%) reported a history of use of FDP for more than 15 years
iii. Single unit crowns were the most common (21.7%) prosthesis in use.

REFERENCES

1. Aslam A, Khan DA, Hassan SH, Ahmed B. **Ceramic fracture in metal-ceramic restorations: the aetiology.** Dent Update. 2017;44:448-56.
2. Shah DS, Vaishnav K, Duseja S, Joshi R. **Clinical evaluation of fixed dental prosthesis failures in indian population: An in vivo study.** Adv Hum Biol. 2014;4:37-43.
3. Prasanna B, Reddy KK, Harsha T, Ramesh G. **Clinical evaluation of conventional cantilever and resin bonded cantilever fixed partial dentures: a comparative study.** J Contemp Dent Prac. 2012;13:793-8.
4. Sampaio-Fernandes JCA, Silva CL, Pinho A, Fernandes PF. **A new system of adhesive fixed partial denture.** Rev odontol UNESP (Online). 2010;39:317-22.
5. Eliasson A, Arnelund C, Johansson A. **A clinical evaluation of cobalt chromium metal ceramic fixed partial dentures and crowns: A three to seven year retrospective study.** The Journal of prosthetic dentistry. 2007;98:06-16.
6. Ikai H, Kanno T, Kimura K, Sasaki K. **A retrospective study of fixed dental prostheses without regular maintenance.** J Prosthodont Res. 2010;54:173-8.
7. Zafar N, Ghani F. **Common post-fitting complications in tooth-supported fixed-fixed design metal-ceramic fixed dental prostheses.** Pak J Med Sci. 2014;30:619-25.
8. Pjetursson BE, Tan K, Lang NP, Brägger U, Egger M, Zwahlen M. **A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years.** Clin Oral Impl Res. 2004;15:625-42.
9. Goodacre CJ, Bernal G, Rungcharassaeng K, Kan JY. **Clinical complications in fixed prosthodontics.** J Prosthet Dent. 2003;90:31-41.
10. Ghani F, Memon M. **Complications in metal ceramic fixed dental prostheses among patients reporting to a teaching dental hospital.** JLUMHS 2010;9:17-22.
11. Anusavice KJ. **Standardizing failure, success, and survival decisions in clinical studies of ceramic and metal–ceramic fixed dental prostheses.** Dent Mater. 2012;28:102-11.
12. Manappallil JJ. **Classification system for conventional crown and fixed partial denture failures.** J Prosthet Dent. 2008;99:293-8.
13. Zarone F, Russo S, Sorrentino R. **From porcelain-fused-to-metal to zirconia: Clinical and experimental considerations.** Dent Mater 2011;27:83-96.

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Wasiq Riaz	Study concept & manuscript writing.	
2	Ayesha Aslam	Data analysis & manuscript writing.	
3	Sara Aziz	Data collection & Review.	