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Research Article

TO DETERMINE THE DIFFERENT FACTORS INVOLVED IN CROWNS AND FIXED PARTIAL DENTURE FAILURE

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Abstract:

Background: Conventional fixed prosthodontics treatment modalities including crown and fixed partial denture are still considered to be effective and performable treatment modalities in the third world countries for the restoration of function esthetics and comfort. The aim of this study was to determine the frequency of Crown and Fixed Partial Denture failure.

Study Design: This was a descriptive cross-sectional study.

Place and Duration of Study: This study was conducted in the department of dentistry of Mayo Hospital Lahore for the duration of one year from March 2019 to March 2020.

Materials and Methods: Total 112 patients selected with Non-Probability Consecutive sampling technique reported with failure of Crown and Fixed Partial Dentures (FPD).

Results: In our study gender distribution of patients was, males were 45 (40.17%) and females were 67(59.82%).The most common factor causing crown failure was periodontal problem (40%) while the least common was aesthetics (2%). While the most important factor causing failure in FPD was caries (35%) and the least was aesthetics (4%). Informed consent was obtained from all patients enrolled. Data was analyzed on SPSS 20 version. Chi-Square test was applied for Statistical significance.

Conclusion: The main factor accounted for failure in crowns was periodontal problem, followed by caries, defective margins, cementation failure, loss of retention and poor aesthetics. While the most frequent factor associated with FPD failure was caries, followed by periodontal problems, loss of retention, defective margins, cementation and esthetics failure.

Key Words: Fixed partial dentures, Porcelian Fused to metal, Fixed prosthodontics, Crowns.

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INTRODUCTION:

Fixed prosthodontics treatment involves the replacement and restoration of teeth by artificial substitutes that cannot be removed by the patient. Conventional fixed prosthodontics treatment modalities including crown and fixed partial denture are still considered to be effective and performable treatment modalities in the third world countries for the restoration of function esthetics and comfort¹. "As a person who has skilled enough with technology in his hand makes it possible to do more work of a higher quality, But in the hand of one who has not mastered the skills of his profession, that technology merely enables one to do tremendous damage"².

Failures of FPD's and crown is a very important question that needs to be answered but the obstacles in the way is the identification of the failure. To identify the causes of failures related to different factors many classifications have been given in the Past³. The increased demand of crowns and FPD's also resulted in an increase in the Frequency of failure associated with such prosthesis⁴. Many classification system have been proposed regarding failures of crowns and FPD's include Tinker classification system 1920, classification of FPD failure by Bennard G.N. Small, Barreto M.T classification system, John F. Johnstan and John J. Manapalill classification system⁵. Crowns and FPD's failure are multiplex and include secondary caries, endodontic complications, defective margins, unacceptable esthetics, cracking and chipping fractures⁶. Detection of the factors leading to FDP failure may guide us in the fabrication of a desirable prosthesis. In recent years, several researchers tried to investigate the factors responsible for FDP failure. Earlier literature has evaluated caries as the leading factor of FDP failure. Krishna Prasad et al concluded in their study that loss of retention accounted for highest number of failures consisting of 27.2% followed by caries (23.3%), periodontal failure (17.5%), aesthetics (7.8%)⁵. According to another study carried out by Al-Ghaffes et al, failure accounted for 40.4% of prosthesis in which defective margin (29.8%) was the major factor leading to failure followed by cementation failure (6.38%)⁷. The aim of the present study was to evaluate the factors leading to failure of crown and FPD's fabricated in PFM in the patient reported to prosthodontics department dental section WMC Abbottabad, in order to have better understanding of the factor that cause crown and FPD failure and help us to avoid these during treatment..

MATERIALS AND METHODS:

This Descriptive cross-sectional study was conducted in the department of dentistry of Mayo Hospital Lahore for the duration of one year from March 2019 to March 2020. A total of 112 patients of both genders (Male and Female), referred to prosthodontics department with complaints of crown and FPD's from the time period Feb 2018 to March 2019 were included in the study.

The study was approved by the institution ethical Committee. Study design was descriptive case series with non-probability consecutive sampling.

Inclusion Criteria:-

- Male and female patients with age ranging b/w 20 to 60 years.
- Patient having no sign of pathology in remaining dentition.
- Patients with Metal-ceramic FPD reporting within three years.

Exclusion Criteria:-

- Patients with history of trauma and severe systemic disease.
- Drug addicts, uncooperative, unwilling and handicapped patients.
- Patient with all ceramic, metal ceramic, implants, post & core and retained FDP's.

Subjects with crown and FPD failure and fulfilling the inclusion criteria selected randomly from prosthodontics department OPD. The restoration type (Crown & Bridge), years of service and factor causing failure were recorded. Criteria of failure classification, reported by Schwartz et al 1970 were followed. Restorations requiring replacement or repair, associated with soft tissue pathosis, pocket formation, excessive mobility, poor esthetics, restoration fracture, defective margins, cementation failure, recurrent caries reported were considered as failure. Clinical examination was carried out by two dentists using a mouth mirror, explorer and periodontal probe. If there were more than one factor of failure, the most damaging factor was recorded. Because failure of a single unit in a multi-unit FPD requires the replacement of whole prosthesis, multiunit FPD was considered as a single prosthesis irrespective of their span. Data was collected on a proforma (Annex). The data was analyzed using SPSS 20 program..

RESULTS:

Total patients included in the study were 112 including, 45 males (40.17%) and females 67 (59.82%).

Table No. 1- Patient included in the study**Total No Patient: - (112)**

S.No	Cases included in the study	No Of Patient	Percentage
1.	Males Patients	45	40.17 %
2.	Females Patients	67	59.82 %

The study showed that out of total 112 patients, 74 (66.07%) cases were reported for crown failure; including 57 (77.21%) endodontically treated teeth and 17(22.97%) non-endodontically treated teeth. The most common factor accounted for crown failure was periodontal problem (40%), Followed by caries (29%), defective margin (15%), cementation failure (9%), loss of retention (5%) and aesthetics (2%).

Table No 2:- Distribution of Cases of failure:-

Crown Failure				FPD Failure			
Total (74)		Percentage (66.07 %)		Total (38)		Percentage (33.92 %)	
Endodontically Treated		Non- Endodontically Treated		Endodontically Treated		Non- Endodontically Treated	
Total (57)	Percentage (77.21 %)	Total (17)	Percentage (22.97 %)	Total (16)	Percentage (42.10 %)	Total (22)	Percentage (57.89 %)

According to the result, 38(33.92%) cases out of total 112 patients reported for FPD failure. The number of endodontically treated abutments was 16 (42.10%) and non-endodontically treated abutments were 22(57.89%). The commonest factor associated with FPD failure was caries (35%), followed by periodontal problems (25%), loss of retention (15%), defective margin (13%), cementation failure (8%) and esthetic (4%).

Table No:-3 Factors accounting for failure:-

S.No	Factors	Crowns Failure	FPD Failure
1.	Periodontal Problem	40 %	25 %
2.	Caries	29 %	35 %
3.	Defective margins	15 %	13 %
4.	Cementation Failure	9 %	8 %
5.	Loss of Retention	5 %	15 %
6.	Aesthetics	2 %	4 %

DISCUSSION:

Fixed Prosthodontics failures are varied and often complex in cause and effect. When a crown or FPD fails, the primary question is whether the problem can be easily resolved or require extensive rehabilitation and reconstruction. To achieve a favorable long term success with crown and fixed prosthesis, a regular recalls of the patients is necessary to evaluate these restorations and supporting structures. Long term follow-up becomes extremely difficult, in this part of the world where patient recall compliance is poor. Therefore the factors leading to the failure and the length of service of restorations were determined by

evaluating the patients when they either presented for the repair or requested replacement of their existing restoration⁷. Result of our study showed that the number of female patients (59.82%) was more than males (40.17%). The most frequent factors associated with the failure of crown was periodontal problem (40%) but in case of FPD the most frequent factor causing complication was caries (35%).A study conducted by Sudhir Pawar showed that the most common cause of failure was the lack of retention accounting for 45% that can be attributed to many causes like improper preparation of tooth with too much taper of proximal walls, one of the proximal

wall being too short and lack of resistance form⁸. In our study, loss of retention accounts for 5% and 15% in crowns and FPD's respectively. In both categories of crown and FPD, aesthetics was found to be the least causative factor scoring 2% and 4% respectively. These results are in contrast with the study carried out by Oginni AO in a Nigerian Dental population, where poor aesthetics was the most common cause of failure. According to study carried out by Alghafeesetal defective margins was the primary cause of failure accounting for 29.7%⁹, which is in contrast with our study. However Schwartz et al¹⁰ and Waston et al¹¹ concluded that caries were the primary cause of failure with the percentage of 36.8% and 22% respectively. The result of these studies was in accordance with our study of FPD failures. Fayyad and Al-Rafee¹² stated that the primary cause of failure in FPD was periodontal disease accounting for 36.6% of failure which is in accordance with our study result of crown failure.

CONCLUSION:

(1) Failure reported in 45 (40.17%) males and 67 (59.82%) females.

(2) Failure recorded in 74 (66.07%) crowns and 38 (33.92%) of FPD cases.

(3) The main factor of failure in crowns was periodontal problem (40%) followed by caries (29%), defective margins (15%), cementation failure (9%), loss of retention (5%) and poor aesthetics (21%).

(4) the most frequent factor associated with FPD failure was caries (35%), followed by periodontal problem (25%), loss of retention (15%), defective margin (13%), cementation (8%) and esthetics failure (4%).

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