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Research Article

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Assessment of Failure Related Factors in Crown and Fixed Partial Denture among Patients Attending Tripoli Central Dental Clinic: A Retrospective Study

Amina Elsalhin@ and Sireen Meheshi

Department of Fixed Prosthodontics; Faculty of Dentistry and Oral Surgery, University of Tripoli, Libya

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ABSTRACT

Treatment carried out with a fixed partial denture (FPD) is one of the most accepted and desired by patients. However, it is a long procedure and cause high expectations from the patient. Once the clinician knows the factors that make dissatisfaction or related to failures, the dentist could reduce them and so meet all the patient's need and set up the most suitable planning. The aim of this study was to evaluate the incidence of failures/clinical complications of the fixed prosthesis and to document the failure related factors that may affect the length of service of crown and fixed partial bridge (FPD) in Tripoli Central Dental Clinic/Libya. Also, the number of retainers, pontics, and the types of restoration were recorded. By examining 74 patients with 297 crown and bridge unites from the Tripoli Central Dental Clinic and collecting data related to the bridge area the data collated were subjected to descriptive analysis. A total of 74 patients were included in the study. Clinical evaluations of the patients were performed. Data were tabulated and patients with failure in prosthesis were calculated in percentage.

The result of the study revealed that the pain was the most frequent complication observed on 56.8% of all the patients, under contour of the retainer has been found in 56.8% with an open margin in 73% and open proximal spaces with 48.6% of all subjects.

Pain and open margins were the most frequent complications observed on 56.8%, 73% of all the patients respectively. Position of 78% of the cases were in the upper arch and four unites bridges found to be most frequent failed bridges in 27% of the subjects.

Key words- *Failures; Fixed partial denture; Bridge units; Patient satisfaction.*

INTRODUCTION

The use of crown and bridgework to restore a patient's dentition is a treatment carried out by clinician on an orderly basis. In spite of proceed in the materials and technologies used to construct such restorations, failure and the need to replace crowns and bridges happens. How long your crown and bridge lasts depend on the effectiveness and regularity of your dental hygiene routine. As a general rule, they last between 7-15 years but longer periods are certainly possible with outstanding oral hygiene and regular dental check-ups.[1]

When missing teeth are replaced by the supplying of fixed partial dentures after proper treatment planning, they can provide acceptable function, esthetics, value for money and longevity. However, in case of improper treatment planning, they are more likely to fail prematurely and lead to irreversible damage to the teeth and supporting structures. Recently, a number of investigators have taken great interest in investigating the life span and long-term quality of fixed dental prosthesis. To be able to prevent these failures when providing a fixed dental prosthesis, clinicians should have adequate knowledge and skills regarding diagnosis, examination, treatment planning and manual dexterity to execute the planned treatment.[2]

Retrospective surveys of failures are helpful when they look at the causes of failure and the time from the restoration being placed to its failure. One of the difficulties in interpreting these surveys is the fact that many of the bridges were made a long time ago using techniques, materials and concepts that are now regarded as old fashion.

A reasonable way to record failures is as a percentage per year. For example, large surveys of bridges made in practice and elsewhere indifferent countries show that about 90% of bridges last at least 10 years.[3]

Duane Michaels said "What I cannot see is interestingly more important than what I can see".

Regrettably, some dentists cannot resist the insertion of multiple (more than two) abutments within the bridge design. This locks-in sound teeth to other compromised abutments. The survival of any bridge will always be dictated by the most compromised tooth. Generally, if the two teeth next to a pontic space are unable to support a bridge predictably, then another restorative option should

@ Author to whom correspondence should be addressed: Dr. Amina Elsalhin; Tel: 00218914233589; E-mail: ami_rajab@yahoo.com

be considered. In general, a bridge of more than four units is high risk.[4]

The main cause of prosthesis failure was lost or caries of abutment teeth and periodontal problems[5,6] Caries recurrence in abutment teeth is directly related to the patient hygiene and to the adjustment of prosthetic pieces by the professional. On the other hand, the periodontal disease progression may be related to the deficiency in oral and general patient's health, smoking habits and genetic factors, and besides the presence of malocclusion and bruxism.[7,8] The period of treatment, which is professional's responsibility, could have an impact on supporting and protection periodontal tissues, especially in the stages of preparation, impression, and prostheses contouring.

Complications resulting from treatment with fixed prostheses are factors that may take place during or after treatment.[9] The clinician should know such complications to be able to finish a detailed diagnosis, treatment planning and execution of procedures giving particular concentration to the most frequent failure factors, and so meeting the patient's expectations and planning the post-treatment care and maintaining.[10]

The aim of this study was to evaluate the incidence of failures/clinical complications of the fixed prosthesis and to document the failure related factors that may affect the length of service of crown and fixed partial bridge in Tripoli Central Dental Clinic. Also, the relation between the number of bridge units and failure. Tripoli Central Dental Clinic (TCDC) was chosen for this study to be conducted as it represents the main dental centre in Tripoli.

MATERIALS AND METHODS

The study was a retrospective examination study that conducted at the Central Dental Clinic. Permission has been obtained from the dental committee in the TCDC prior to commencing the study. The classification of failures was similar to those reported by Schwartz et al.[11], and Walton et al.[12] to allow for comparison with previous study. A restoration that required repair or replacement was considered a failure. A form was designed to record the data obtained from the clinical examination. The prosthesis type, position, years of service, retainer/crown and pontic type, and cause of failure, if any, were recorded.

The subjects in the study consisted of 74 patients (297) units. Of these subjects 70.3% (52) were female and 29.7% (22) were male ranging from 18-75 years old of age with female to male ratio 70.3:29.7 (Table 1). No correlation was found between type of failure and, years of service, or FPD type.

Patient recruitment: patients came to dental practice for routine dental problems were invited to take part in the study (Table 2). They were recruited in accordance with the study protocol.

RESULTS

Data analysis

The data collected were entered to SPSS (statistical package for social science, Ink Illinois, USA) version 27.

The length service of all restoration observed in this study was 55.4% more than 5 years as shown in (Figure 1).

Pain was the most frequent complication, observed on 56.8% of all the patients while aesthetic was not counted for any of the patients (Figure 3). From the bar chart it's obvious that the pain is the most frequent complication with (56.8%) of all the cases; followed by pain with caries (14.9%) and fracture with (12.2%).

Types of restoration were recorded and (Figure 2) illustrates the percent of the different type of prosthesis. Fixed-fixed bridge was the most used type of prosthesis observed on 71.6% of all the patients participated in the study. Number of unites were recorded and the result showed that 27% of the cases have four unites followed by 23% who have one unite (Figure 4).

Table (3) displays the position of prosthesis in the patients recruited in the study with most of the cases was in upper position (78%).

The study also revealed that by examining the retainersmargin73% of all retainers with open margins (Figure 5), 56.8% of all retainers examined have under contour shape and 48.6% with open proximal spaces (Table 4, 5 respectively).

Bad taste has been examined before, after and before and after placement of prosthesis and the result showed that majority of patients had bad taste before and after placement 60.8% (Table 6).

Table 1: Demonstrate male to female ratio

Gender				
	Frequency	Percent	Valid Percent	Cumulaive Percent
Valid	male	22	29.7	29.7
	female	52	70.3	100.0
	Total	74	100.0	

Table 2: Demonstrate patient and units number

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Number of unites	74	1	13	297	4,01	2,767

Table 3: Position of prosthesis

Position of FPD	Frequency	Percentage
Upper Jaw	58	78
Lower Jaw	16	22
Total	74	100

Table 4: Examination of Retainer shape

Retainer Shape	Frequency	Percentage
Normal	8	10,8
Under-contour	42	56,8
Over-contour	24	32,4
Total	74	100

Table 5: Examination of Retainer Proximal space

Retainer Proximal Space	Frequency	Percentage
Normal	9	12,2
Open	36	48,6
Close	29	39,2
Total	74	100

Table 6: Demonstrate frequency and percentage of bad taste

Bad Taste	Frequency	%	Cumulative %
Before placement of FPD	6	8,1	8,1
After placement of FPD	23	31,1	39,2
Before and After	45	60,8	100
Total	74	100	

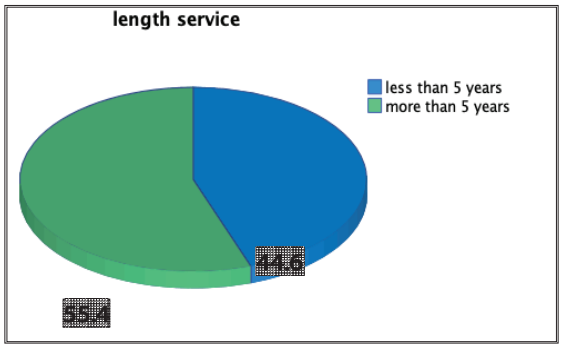

Figure 1: Length of service

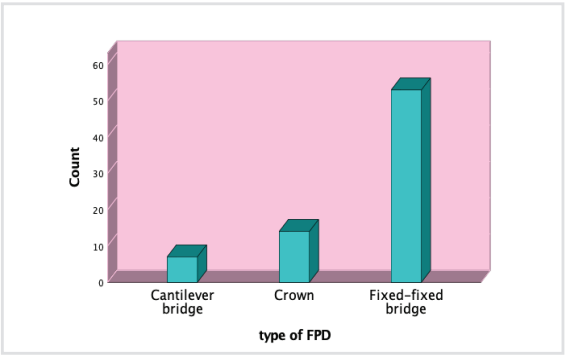

Figure 2: Type of Prosthesis

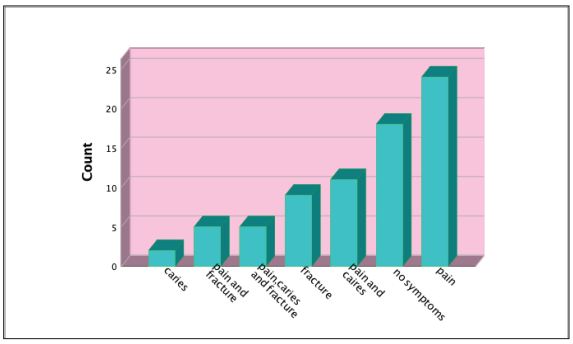

Figure 3 : Demonstrate the common complication observed

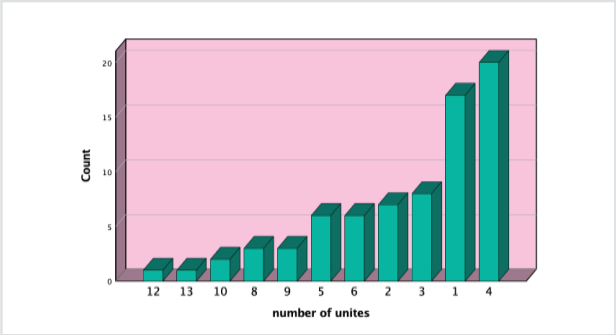

Figure 4 :Demonstrate Number of unites

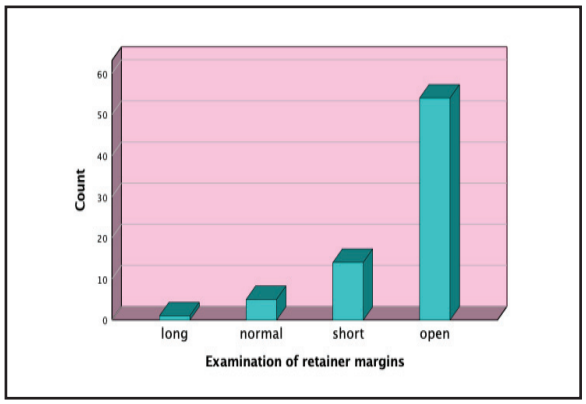

Figure 5: Examination of retainer margins

DISCUSSION

This was the first study to be undertaken in Libya/Tripoli that aimed to explore whether the failure of crown and bridge is more after short or long duration of prosthesis in service and investigate the relation between length of bridge span (number of units) and a failure rate in addition to some other failure related factors among 74 Libyan patients living in the city of Tripoli.

In the present study pain was the most frequent complication this finding is with disagreement with previously reported studies in western countries where dental caries was the most common finding (Walton et al.)[12], this may explain by the high percent of open and short margin (73%, 18.9%) respectively, which could lead to sensitivity with discomfort (pain). The importance of making a highly accurate impression with a well-defined finish line is the first and most important step in creating superior crown and bridge restoration. Crown and bridge failures are one of the most routinely encountered problems by the dentists. A recent systematic review revealed the cumulative 5-year survival rates of 93.5% for fixed partial dentures with a complication rate of 27.6%.[13] In present study all restorations observed showed that the length service of 55.4% more than 5 years while 44.6% failed in less than 5 years.

In fixed prosthodontics single crowns and fixed partial dentures of up to 3 units are the most commonly used restorations, so more failures are likely to be reported in such prosthesis.[4] These observations are reiterated by the results of Naz et al[14] study which show that more than half (59.5%) of the failed restorations examined were single-unit crowns, followed by 16% of 3 unit fixed partial dentures.

Generally, fixed partial dentures that extend for a span of more than four units present a higher risk of failure. Randow[15] reported similar results whereby there were increased failure rates of long span bridges, ranging from 7% for prostheses of 7-units to 23% for prostheses having 10-units. In the present study, more failures are seen in bridges with 4 units and more (about 57%. In contrast to Naz et al[14], where no relation was found between the span of prosthesis and its life. Single unit crowns and small bridges examined in the study had a life of 4 years approximately, whereas prostheses that were of 5 units or more had a life of more than 7 years. These findings are similar to Walton[16] who did not find any relation between prosthesis span and life of prosthesis.

Internationally, several surveys have been conducted to assess the mean age that the prosthesis lasts for. The mean prosthesis age in Naz et al[14] was found to be 4.8 years; that is comparatively less than the mean age found by Prasad et al 7.3 years and Walton[16] et al 8.3 years but longer than the mean prosthesis age found by Cheung[17] et al 2.8 years. Also, two studies have been available presenting 5-year results of all-ceramic FDPs (Vult von Steyern et al. 2001; Olsson et al. 2003). Both these studies analyzed In Ceram Alumina FDPs. One reported a 10% failure after 5 years (Vult von Steyern et al. 2001) and the other one reported 12% failure after 6 years (Olsson et al. 2003).

Regarding number of units. Cantilevers function well on implant-supported restorations but are associated with increased risk of failure and complication when used on tooth-supported restorations.[18] This disagrees with our study where the majority of failures were in fixed-fixed bridges which may be because of reduced number of patients having cantilever bridges. Furthermore, the survival of single metal-ceramic crowns was 95.6% after at least 5 years. For FDPs the survival differed somewhat between different types of bridges after 5 years, but the differences increased substantially after 10 years, indicating that long term studies should preferably be longer than 5 years. Decreased survival after 10 years was especially evident for cantilever FDP.[18]

According to Foster, the overall mean age of the bridges at failure was 6.2 years; anterior and complex bridgework had a mean age of about 5 years, compared with 7.5 years for posterior bridges.

The lifespan of the bridgework was significantly correlated with the number of retainers but not with the number of units. Bridges with one or two retainers had an average lifespan of just over 7 years, whilst those with three or more retainers had been in service for, on average, only 4 years.[19]

CONCLUSION

In light of this literature, pain due to open margins and under contoured retainer with open proximal space and bad taste experience individually or together can influence the survival, longevity, and success of the prostheses, also to reduce the failure rate of a prosthesis and improve prosthesis longevity, long span prosthesis should be avoided. Once the clinician knows the factors that make dissatisfaction or related to failures, the dentist could reduce them and so meet all the patient's need and set up the most appropriate planning.

Limitations of the study

The study is limited to the patients of only on Tripoli area, namely the, Central Dental Clinic/Tripoli.

Technical failure was not a variable.

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