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Original Research Article

Evaluation of Fixed Partial Dentures' Complications among Patients Attending a Dental College in Riyadh, Saudi Arabia

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Introduction: *Though FPDs are often successful in the rehabilitation of patients' oral health, they are occasionally associated with several kinds of complications and unwanted situations.* ***Materials and methods:*** *This is a cross-sectional study conducted among the patients visiting REU clinics with a total of 506 patients having at least one FPD placed previously filled up the survey. An online questionnaire in Arabic was designed using Google Forms with questions related to personal and demographic information followed by history and any complication related to their FPD.* ***Results:*** *Regarding the prosthesis types and material, n=296 (58.5%) had crowns, n=95 (18.8%) had 2 unit bridge, n=66 (13%) had 3 unit bridge and n=49 (9.7%) had 4 or more unit bridge. Moreover, n=112 (22.1%) had metallic prosthesis, n=237 (46.8%) had ceramic prosthesis and n=157 (31%) had metal + ceramic. 28.7% of the study subjects said that they have experienced one or more FPD-related problems which include pain (16.2%), breakage of teeth (12.1%), and denture breakage (13%).* ***Conclusion:*** *Overall prevalence of complications related to fixed prosthesis was low. Most common complaints included inability to maintain hygiene and bad odor.*

Keywords: Fixed prosthesis, Complications, Dental patients.

INTRODUCTION

Tooth/teeth replacement has been and will always be the most important dental treatment provided to patients having missing tooth/teeth. There are multiple options to replace a missing tooth, which include removable as well as fixed prosthesis. These are further divided into various types and materials, which possess their individual distinctive properties (Dawson et al, 2018; Pun et al, 2011).

As far as the fixed dental prosthesis are concerned, there are multiple options available for the patients depending on their oral health, preferences, and dentist's opinion. These include crowns and bridges, which are constructed using different kinds of materials including metal, ceramic, and combinations as well. Furthermore, dental implants are also included in this category and are one of the most reliable methods to replace a missing tooth (Paquette et al, 2018; Lemos et al, 2016).

Generally, periodontal factors do not have a very obvious effect on FDPs' survival rates but as it is critical to harmonize between the two to avoid an unsatisfactory outcome which may require a more expensive and detailed treatment. Therefore the design of the prosthesis, the number and quality of the abutment teeth, the preparation, and the material used, need to be considered when planning prosthodontic treatment (Abduo & Lyons, 2017).

Though FPDs are often successful in the rehabilitation of patients' oral health, they are occasionally associated with several kinds of complications and unwanted situations, which include caries, periapical lesion pain or discomfort, periodontal disease, and abutment fracture (Sharma, Tiwari & Singh, 2017). As far as the frequency of these complications of FPDs are concerned, around 2.5% of the dentures were failed due to caries in one of the underlying teeth, around 10% of the cases may get complicated due to pulp necrosis, loss of FPD due to periodontal ill-health was found to be on the lower side (0.5%), 2.1% cases were failed due to the fracture of abutment tooth and 3.2% were faced by material complications including damage to framework and veneers (Seong & May, 2019).

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Several studies in different parts of the world have been conducted to evaluate the complications associated with fixed partial dentures. An investigation based in Ahmedabad, India focused on the patients visiting the department of Prosthodontics. Findings suggested that 64% of the study subjects reported looseness and dislodgement. On the other hand, 54% of them faced difficulty in maintaining oral hygiene (Chavda et al, 2019).

Another study conducted in Al Kharj, Saudi Arabia reported the around 3% of the participants had faced discomfort when using their FPD on daily basis. A similar number of subjects showed dissatisfaction from mastication (Almutairi, 2017). Furthermore, another Indian-based investigation in a dental school revealed that 52% of the patients had experienced looseness and dislodgment, whereas 51% of them were not able to maintain oral hygiene. 27% of the study subjects reported the color of FPD being changed over the period of some time, whereas 12% of them reported breakage of prosthesis and 8% revealed tooth fracture under the FPD (Ashok & Sangeetha, 2016).

Study Hypotheses

Problems such as dislodgment, fracture, and poor oral hygiene are prevalent among patients who received FPDs in REU clinics.

Aims of the study

- To determine the prevalence of problems related to FPD after their placement.
- To determine the prevalence of most and the least common complication associated with FPD use.
- To compare the complications on the basis of their duration of placement.
- To compare the complications on the basis of the type of materials used in the fabrication of prosthesis.

MATERIALS AND METHODS

Study Design

This is a cross-sectional study conducted among the patients visiting REU clinics using an online survey.

Study Sample

Saudis (male and female) and more than 18 years of age willing to participate in this study were requested to fill up the survey. A total of 506 patients having at least one FPD placed previously filled up the survey.

Study instrument

An online questionnaire was designed using Google Forms with questions related to personal and demographic information followed by history and any complication related to their FPD. The questionnaire was translated into Arabic.

Instrument Validity and Reliability

A pilot study was conducted by letting the survey filled by 20 participants and the data was inserted in SPSS version 22 to determine the reliability by using Chronbach's coefficient alpha (Value was .791). The validity of the questionnaire was tested by sending it to experienced researchers in REU and no changes were made.

Statistical Analysis

Collected data was analyzed using SPSS version 22, where descriptive as well as inferential statistics were conducted. Comparisons between groups were made with the value of significance kept under 0.05.

RESULTS

Descriptive statistics can be observed in table 1 and 2 with n=288 (56.9%) males and n=218 (43.1%) females. According to age groups, n=329 (65%) were 18-30 years, n=95 (18.8%) were 31-45 years, n=69 (13.6%) were 46-60 years and n=13 (2.6%) 60+ years. As far as educational levels were concerned, n=8 (1.6%) had primary education, n=23 (4.5%) had secondary education, n=150 (29.6%) had high school education and n=325 (64.2%) went to university.

Regarding their prosthesis types and material, n=296 (58.5%) had crowns, n=95 (18.8%) had 2 unit bridge, n=66 (13%) had 3 unit bridge and n=49 (9.7%) had 4 or more unit bridge. Moreover, n=112 (22.1%) had metallic prosthesis, n=237 (46.8%) had ceramic prosthesis and n=157 (31%) had metal + ceramic. When inquired about any problems faced by their prosthesis, n=145 (28.7%) reported with 'Yes'. Cross tabulation is presented in tables 3, 4, and 5.

DISCUSSION

This study was aimed at evaluating fixed partial dentures' complications among patients in Riyadh, Saudi Arabia. As presented in the results section we compared the findings on the basis of denture type, material type, and time of FPD placement. 28.7% of the study subjects said that they have experienced one or more FPD-related problems which include pain (16.2%), breakage of teeth (12.1%), and denture breakage (13%). Another study reported a similar type of Complications which resulted in pain for the patient (14%), breakage of teeth (10%) and abutment fracture (3%) (Swain, 2018).

As far as denture type is concerned, statistically significant differences were found when inquired whether the individuals faced any FPD-related problems (p-value: .000). The answers showed that persons who had 4 unit bridges faced more problems than the other types. Also, statistically significant differences were found when inquired about Tooth/Abutment breakage (p-value .040) and Halitosis/Bad odor (p-value: 0.049) for the persons with 4 unit bridge. The lowest incidence was recorded in crown type. In one of the study carried it was noted that the most common complications reported in dental bridges were looseness, abutment, and caries (Zlatanovska et al, 2019)

The individuals whose material type was ceramic + metal, showed statistically significant differences when inquired whether they faced any FPD-related problem (p-value: .000). When asked about the problem type these individuals also reported problems of looseness (p-value: .045), food getting stuck (p-value: .048) and Halitosis/Bad odor (p-value: .035). The results are in line with another study that shows ceramic-based FDP's were better at abutment fracture than metal-ceramic FDPs (Zhang et al, 2017).

With compared with the time elapsed after FPD placement, no statistically significant differences were found.

Table 1. Descriptive analysis of study participants and their fixed partial dentures

Variables	Frequency (%)
Gender	Males: 288 (56.9%) Females: 218 (43.1%)
Age group	18-30 years: 329 (65%) 31-45 years: 95 (18.8%) 46-60 years: 69 (13.6%) 60+ years: 13 (2.6%)
Educational level	Primary: 8 (1.6%) Secondary: 23 (4.5%) High school: 150 (29.6%) University: 325 (64.2%)
Prosthesis type	Crown: 296 (58.5%) 2 unit bridge: 95 (18.8%) 3 unit bridge: 66 (13%) 4 or more unit bridge: 49 (9.7%)
Material type	Metal only: 112 (22.1%) Ceramic only: 237 (46.8%) Metal + ceramic: 157 (31%)
When was FPD placed?	Within last 1 month: 58 (11.5%) Within last 3 months: 23 (4.5%) Within last 6 months: 31 (6.1%) Within last 1 year: 126 (24.9%) Don't remember: 268 (53%)
Experienced any problem with the prosthesis?	Yes: 145 (28.7%) No: 361 (71.3%)

Table 2. Frequencies of FPD related problems

Problems	Frequency
Looseness	n=87 (17.2%)
Unable to chew	n=68 (13.4%)
Food gets stuck	n=97 (19.2%)
Denture breakage	n=66 (13%)
Tooth/Abutment breakage	n=61 (12.1%)
Pain under the denture	n=82 (16.2%)
Sensitivity	n=80 (15.8%)
Unable to maintain oral hygiene	n=92 (18.2%)
Halitosis/Bad odor	n=91 (18%)

Table 3. Significant associations of Denture type with problems associated with it

Problems	Type of Prosthesis	*p*-value
Faced any problem?	Crown: 22% 2 unit bridge: 32% 3 unit bridge: 36% 4 unit bridge: 55%	.000
Looseness	*No statistically significant association observed*	
Unable to chew	*No statistically significant association observed*	
Food gets stuck	*No statistically significant association observed*	
Denture breakage	*No statistically significant association observed*	
Tooth/Abutment breakage	Crown: 34% 2 unit bridge: 39% 3 unit bridge: 42% 4 unit bridge: 67%	.040
Pain under the denture	*No statistically significant association observed*	
Sensitivity	*No statistically significant association observed*	
Unable to maintain oral hygiene	*No statistically significant association observed*	
Halitosis/Bad odor	Crown: 67% 2 unit bridge: 43% 3 unit bridge: 78% 4 unit bridge: 67%	.049

Table 4. Significant associations of Material type with problems associated with it

Problems	Type of Material	*p*-value
Faced any problem?	Metal: 31% Ceramic only: 20% Metal+ceramic: 39%	.000
Looseness	Metal: 31% Ceramic only: 20% Metal+ceramic: 39%	.045
Unable to chew	*No statistically significant association observed*	
Food gets stuck	Metal: 70% Ceramic only: 50% Metal+ceramic: 77%	.048
Denture breakage	*No statistically significant association observed*	
Tooth/Abutment breakage	*No statistically significant association observed*	
Pain under the denture	*No statistically significant association observed*	
Sensitivity	*No statistically significant association observed*	
Unable to maintain oral hygiene	*No statistically significant association observed*	
Halitosis/Bad odor	Metal: 65% Ceramic only: 50% Metal+ceramic: 74%	.035

Table 5. Significant associations of FPD Placement Duration with problems associated with it

Problems	FPD Placement Duration	*p*-value
Faced any problem?	*No statistically significant association observed*	
Looseness	*No statistically significant association observed*	
Unable to chew	*No statistically significant association observed*	
Food gets stuck	*No statistically significant association observed*	
Denture breakage	*No statistically significant association observed*	
Tooth/Abutment breakage	*No statistically significant association observed*	
Pain under the denture	*No statistically significant association observed*	
Sensitivity	*No statistically significant association observed*	
Unable to maintain oral hygiene	Within last 1 month: 50% Within last 3 months: 62% Within last 6 months: 100% Within last 1 year: 100% Don't remember: 64%	*.039*
Halitosis/Bad odor	*No statistically significant association observed*	

However, the inability to maintain oral hygiene reported a significant difference for individuals who had the placement done for a time period from 6 months to 1 year (p-value: .039). However, the results from our study contradict one of the studies where it was noted that the statistically significant differences were found by individuals who had their placement done during a period of 2-5 years (Riaz, Aslam & Aziz, 2018).

CONCLUSION

- Overall prevalence of complications related to fixed prosthesis was low.
- Most common complaints included inability to maintain hygiene and bad odor.
- Types of prostheses as well as materials were significantly associated with complications to some extent.
- Duration of prosthesis had no bearing on the complications.

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