

Failures of Crowns and Bridges in Dental School Patients in Jeddah, Saudi Arabia

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Abstract: The complications of fixed partial dentures and single crowns have a great importance to be evaluated. The objectives of this study were to determine the prevalence of complications associated with crowns and bridges and the effect of service duration on the prevalence of complications among a population of Batterjee Dental Clinic. A total of 98 patients, with 44 FPD and 54 single crowns were selected. Questionnaire had questions pertained to the period, nature of complaint, and type of materials used. Clinical examination was performed. Statistical analysis was done using a Statistical Package for Social Science. The Results of this study showed that the percentage of the failures were Periodontal disease (51%), Gingival bleeding (46.9%), Open margins (43%), Caries (41%), Shade mismatch (42%), Occlusal wear of the opposing tooth (20.4%) prostheses loose (13%) and porcelain or abutment fracture (12.2%). The duration of service was found to influence most of the assessed complications especially periodontal disease, Shade mismatch and Occlusal wear. With limitation of this study, the periodontal disease and gingival bleeding are the most frequent complications responsible for failure of fixed partial denture and single crowns that recommend an effective method to control dental diseases and to improve dental awareness.

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I. Introduction

Fixed Dental Prostheses (FDPs) replace missing teeth and are attached definitely to the remaining teeth. The conventional crown and fixed partial denture treatment modality being a very commonly practiced and highly successful in restoring the functions of lost or missing one or more teeth and thereby. The restorative material may be all metal, all porcelain, a metal-ceramic combination, or a metal with processed resin. The comfort of individual a care must be taken to avoid the common causes leading to their failures. The proper selection of the case, careful diagnosis, meticulous preparation, and a professional construction of prosthesis are mandatory to success and longevity of restoration and maintenance of health of biological investing tissues. (4,5) 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. (3) There are three main types of failures Biologic failure, mechanical failure and aesthetic failure. Clinical failure may occur during or after fixed prosthodontic treatment procedure. (4) Failure and complications associated with fixed prostheses include, but not limited to the loss of retention, caries, endodontic complications, periodontal disease, tooth fracture or porcelain fracture, and unsatisfactory esthetics of the prosthesis. (1) When a crown or Fixed Partial Dentures (FPD) fails, the primary question is whether the problem can be easily resolved, or requires extensive rehabilitation and reconstruction. A mild failure may be considered one that is generally correctable without having to remake the restoration. (3)

II. Methodology

A total of 98 patients (age range of 20-71 years, 42 of the participants were females and 56 males) with 44 FPD and 54 single crowns were selected randomly from the dental clinic at Batterjee Medical College, Dentistry Program. 54 patients were non-Saudi while 44 patients were Saudi and all lived in Jeddah, Saudi Arabia. A sample questionnaire will prepared in order to collect the relevant data. Patients with at least 3 units fixed partial denture or a single crown with the presence of natural contra-lateral tooth / teeth will included. All prostheses will be performed by several general dental practitioners with a minimum of one year service duration. Patients will informed and written consents will be obtained. Age, gender and the time of prostheses placement will be recorded. Complete clinical and radiographic examinations will be conducted. Statistical analysis was done using a Statistical Package for Social Science (SPSS, version 22). Descriptive statistics, including means and standard deviations were calculated for continuous variables, frequency and percentage for categorical variables, were calculated.

Pearson's chi-square test was performed to examine the association between complications prevalence as well as the type of prostheses, service time and nationality ($\alpha = 0.05$).

III. Results

The study participants had a mean age of 38.3 years. The mean and median length of time in service of the prostheses were 6.1 and 5 years, respectively. Prevalence of complications and/or failures of fixed prostheses are presented collectively in figure (1) the single crown or FPD may have more than one complication

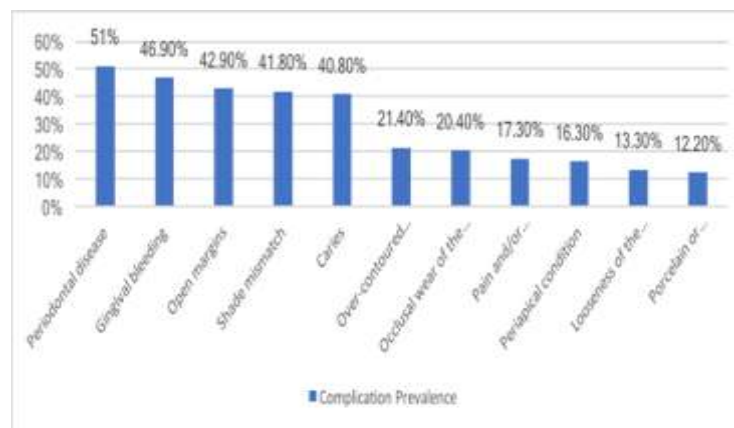


Figure (1) the single crown or FPD may have more than one complication

Figure (2) shows the prevalence of complications according to the type of prostheses whether single or 3 units FPD, the single crown or FPD may have more than one complication. The following complications were significantly more common for the 3-unit fixed partial denture than for single crowns ($p < 0.05$) which include; prostheses with open margins ($p < 0.035$) caries ($p < 0.01$), occlusal wear of the opposing tooth ($p < 0.01$), periapical condition ($p < 0.036$), looseness of the prostheses ($p < 0.002$) and porcelain or abutment fracture ($p < 0.0001$).

The other complications were not significantly different between single crown and the 3-unit fixed partial denture.

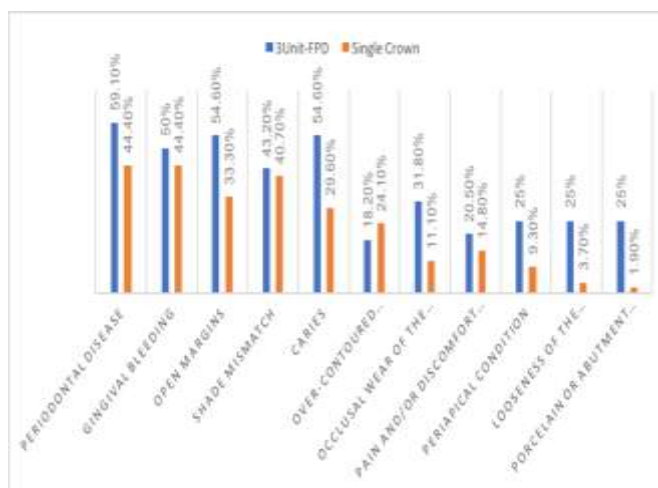


Figure (2) the single crown versus 3 units FPD

The effect of service duration on the rate of complications is shown in figure (3). 100% of the prostheses that were in place for more than 15 years had periodontal disease. The same percent for Shade mismatch and Occlusal wear of the opposing tooth; whereas only less than 31%, 38% and 11% of those which were in service for 5 years or less had Periodontal disease, Shade mismatch and Occlusal wear of the opposing tooth respectively. Open margins, caries also increased with increased service duration. Gingival Bleeding was more common in prostheses with shorter service duration. Over-contoured restoration, pain and/or discomfort associated with the fixed prosthesis, periapical condition, looseness of the prostheses and porcelain fracture

were not associated with service duration ($P > 0.05$) 44 of the patients are Saudi (44.9%) and 54 (55.1%) are non-Saudi.

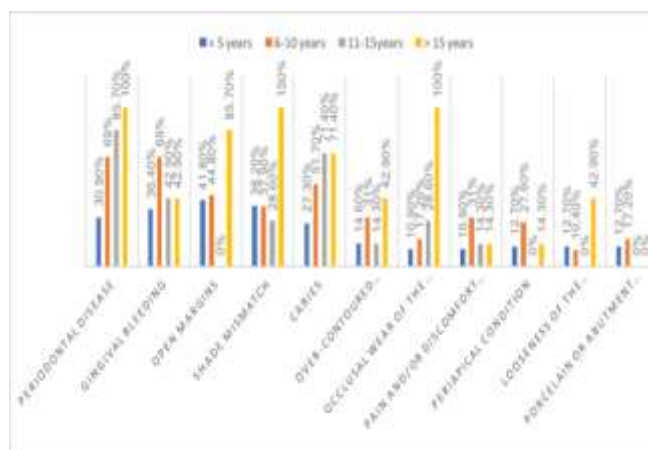


Figure (3) the effect of service duration on the rate of complications

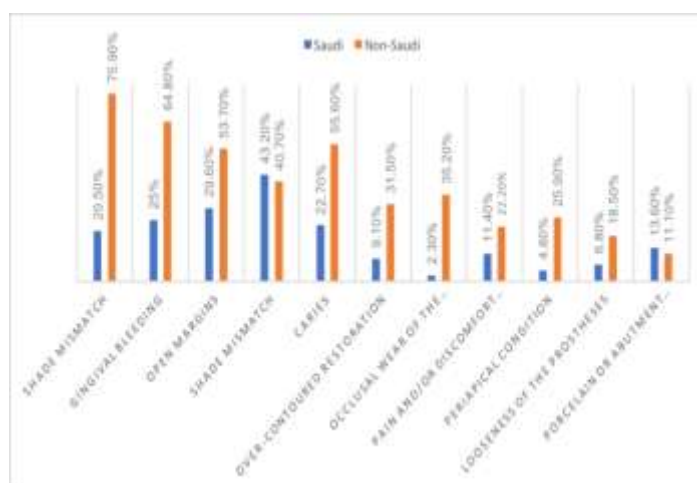


Figure (4) Complication between Saudi and non-Saudi complication

According to the nationality, we found that the following complications were significantly more common in non-Saudi patients: periodontal diseases (75.9%), gingival bleeding (64.8%), open margins (53.7) and caries (55.6%), occlusal wear of the opposing tooth (35.2%), Over-contoured restoration (31.5). and this difference may be due to the good socioeconomic status and full health insurance for Saudi over non-Saudi patients.

IV. Discussion

The study shows the most common complication was the periodontal disease which is greater than that reported in previous studies ^(1,3,4,6) that could be due to a lack of professional maintenance therapy were oral hygiene measures and regularly reinforced. In the present study, the gingival bleeding was observed due to bad oral hygiene and plaque accumulation, whereas in other studies ^(1,2,3,4,5,6) no incidence of gingival bleeding. In the current study found high rate failure of open margins and caries, these results were agreed with Johar⁽¹⁾, Libby et al⁽²⁾, while the study disagreed with Singh et al⁽⁴⁾. The results were high may be due to the lack of dentist experience. The prevalence of units had shade mismatch in the study by Johar⁽¹⁾ was high rate than in present study, due to the shades of prostheses were selected without using the correct light and the shade guide, while in other studies were disagreed ^(3,4). In the current study and the study as reported by Libby et al⁽²⁾, Occlusal wear of the opposing tooth was showed some differences, that's may happen due to clenching and the type of prostheses against natural teeth, while in other studies ^(1,3,4,5,6) no incidence of it. The present study was agreement with Singh et al⁽⁴⁾ regarding the loss of retention, due to a small amount of the remaining tooth structure and the type of cement, while Johar⁽¹⁾ was disagreed (high rate). The present study was agreement with Libby et al and Singh et al^(2,4) in the least frequent complication (porcelain or abutment fracture), related to

previous endodontic treated and trauma. The following complications were significantly more common for the 3-unit fixed partial denture than for single crowns ($p < 0.05$) which include; prostheses with open margins ($p < 0.035$) caries ($p < 0.01$) (These finding is similar to a finding of Johar⁽¹⁾), occlusal wear of the opposing tooth ($p < 0.01$), periapical condition ($p < 0.036$), looseness of the prostheses ($p < 0.002$) and porcelain or abutment fracture ($p < 0.0001$).The other complications were not significantly different between the single crown and the 3-unit fixed partial denture, may be the single crown is more hygienic (easy to clean) than 3-units fixed partial denture. In another hand, the 3-unit fixed partial denture has more frequent of open margins that lead to the occurrence of decay than the single crown.

V. Conclusion

With limitation of this study, the periodontal disease and gingival bleeding are the most frequent complications responsible for failure of fixed partial denture and single crowns.

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