

## Occlusal Interferences In FPD Insertion Among Dental Undergraduates - A Questionnaire Study

Research Article

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### Abstract

Occlusal interference in Fixed Partial Denture (FPD) is one of the most common errors that occur during insertion. It can lead to the failure of the treatment and sometimes causes TMJ disorders. Hence the aim of the study was to evaluate the frequency of occlusal interferences in FPD among dental undergraduates. A questionnaire study was conducted among dental undergraduate students studying in a dental college in Chennai. A total of 100 undergraduate students participated. It consisted of questions regarding their practice and incidence of occlusal interference in FPD. The data was collected and analysed through IBM SPSS statistical analysis. Descriptive statistics was done. Percentages and frequencies were calculated and to test difference among variables the Chi-square test was done. In this study, 95% of students had come across occlusal interference during FPD insertion. About 45.26% of the students reported lower posterior as the most common site of occurrence on occlusal interferences. About 99% of the students reported articulating paper as the most common method of correcting this error. This study concluded that the occurrence of occlusal interference is higher among dental undergraduate students.

**Keywords:** Occlusal Interference; Fixed Prosthesis; Undergraduate Students; Articulating Paper; Survey.

### Introduction

The tooth loss is the result of multifactorial causes mainly by the dental carrier and periodontal diseases [1]. It affects the patients profusely with few impact on functions, aesthetics and performance of the dentition [2]. Determining the need, prevalence and pattern of the tooth loss is important to identify the prosthetic needs of the patients. Fixed partial Denture (FPD) is one of the most preferred modes of treatment among patients with partial tooth loss [3]. It is indicated where one or more teeth are missing or requires removal, where teeth are replaced by pontics that are designed to fulfill the functional and aesthetic requirement of missing tooth [4].

Teeth require preparation to receive restorations which must be based on the fundamental principles for the successful outcome of the treatment. A good preparation ensures that the subsequent

techniques such as impression making, pouring of dies and casts, waxing etc can be readily accomplished [5].

Occlusion is fundamental to the success of fixed prosthodontic treatment. It is defined by the glossary of Prosthodontics as the static relationship between the incising or masticating surfaces of the maxillary or mandibular teeth or tooth analogues [6]. Any interference to the normal occlusal contacts produce deviation during closure of maximum intercuspation, hinder smooth passage to and from the intercuspation position and lead to deflective occlusal force on the bridges which may lead to damaging effects on abutment and also on the retention of the casting [5].

All these interference should be removed before casting or at least before the intraoral insertion of the prosthesis. If not, it can lead to numerous complications including pain, discomfort, tooth mobility, tooth wear, fractured teeth or restorations and TMJ dys-

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function[7].

As a clinician, it is important to identify, prevent and alter the existing occlusion if needed. It is also the essential duty of the clinician to provide the laboratory with appropriate clinical records to ensure minimal error during insertion.

Previously our researchers have conducted numerous case studies [8, 9], *in-vitro* studies [10-12], cross sectional studies [13-16] and literature reviews [17-22], over the past 5 years. Hence in this study, an attempt has been made to evaluate the frequency of occlusion interferences in FPD among undergraduate dental students in their clinical practices.

## Materials and Methods

### Study Design

A cross sectional study was carried out among dental undergraduates of a University in Chennai who were practising in clinics.

### Sampling

This study was conducted in an online setting. A total of 100 dental undergraduates were chosen. Simple random sampling methodology was employed, till the sample size was achieved.

### Inclusion Criteria

Randomly selected students who were practising in clinics till the sample size is achieved.

### Exclusion Criteria

Students who were not attending any clinics.  
Those who were not willing to participate in the study.

### Questionnaire

A standard questionnaire was prepared. A pilot study was conducted among the subset of the study population. Then it was mailed to randomly chosen 100 dental undergraduates. The questionnaire consisted of 3 parts. The first section of the questionnaire consisted of students' personal data including age, gender, year of study for identification purposes. The second division contained data regarding the occurrence of occlusion references. The third portion comprised questions regarding their attitude towards prevention and correction methods. The positive responses came from all the students with a response rate of 100%.

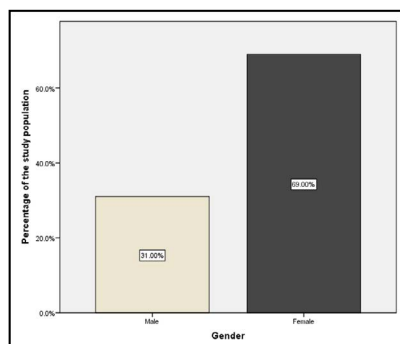
### Statistical Analysis

The data from their responses were entered in the excel sheet. The analysis was done through the chi-square tests and frequency tests using SPSS software.

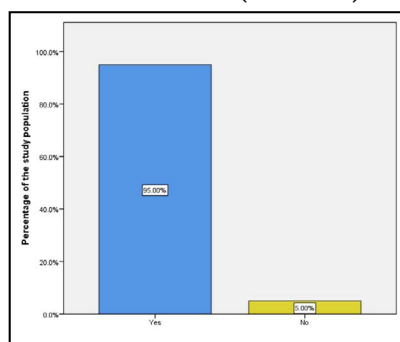
## Results and Discussion

Out of 100, 69 were females and 31 were males (Graph 1). The mean age of the study group was 21.3. Among 100 students, 95% of the students had come across occlusal interference during the FPD insertion of their practice (Graph 2).

**Graph 1.** Bar chart showing the distribution of the study population based on gender. X-axis denotes the gender distribution of the students and Y-axis denotes the distribution of the students in percentage. Out of 100, 69 were females(dark grey bar) and 31 were males(white bar).



**Graph 2.** Bar chart showing the distribution of the study population who had experienced occlusal interference during FPD insertion. X-axis denotes the presence of occlusal interference during FPD insertion and Y-axis denotes the distribution of the students in percentage. About 95% of the students had come across occlusal interference during the FPD insertion of their practice(blue bar) and 5% of the students never had any occlusal interferences in their practice(yellow bar).grey bar and 31 were males(white bar).



In the study population, the total number of FPD cases the undergraduates had done in their practice ranged from 2 to 10 (Graph 3). There was a higher incidence of 2(35.8%) and 3(32.6%) occlusal interferences among students who had done FPD insertion and this finding is statistically significant (Graph 4).

About 45.26% of students reported lower posterior and about 38.95% reported upper posterior as the most common site in which they had occlusal interferences (Graph 5). About 99% of the students preferred articulating paper to correct the occurrence of Occlusal interference in FPD. Only 1 student had preferred T-Scan (Graph 6).

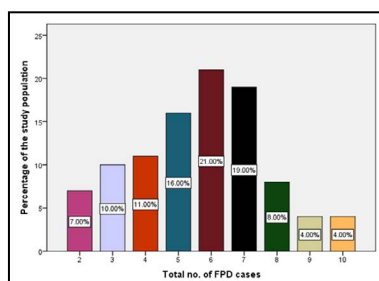
In this study, about 88% of the participants reported checking FPD in a cast for fit before intraoral insertion (Graph 7). Among

100, 92% of students reported having taken measures to prevent occlusal interference (Graph 8). About 96% of the students reported that they have considered occlusal interference as the most common error during FPD insertion (Graph 9).

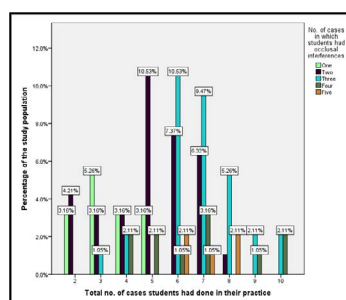
In this study, 85% of the students reported to glaze the FPD after occlusal correction and about 5% reported having glazed the FPD occasionally after correcting occlusal interference (Graph 10).

Crowns and Fixed partial dentures (FPD) are the major prosthetic treatment modalities for the past several decades. With increased tendency of the middle-aged and older-aged individual to retain a relatively higher number of teeth, other treatment modalities like removable prosthesis and implants are possible. However, FPD is still a favourable option as they provide psychological and social

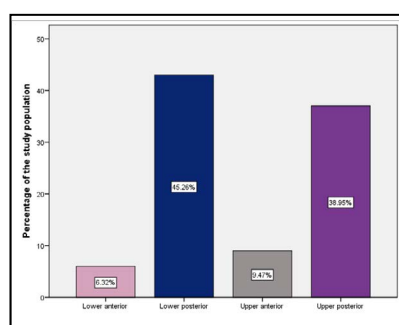
**Graph 3.** Bar chart showing the distribution of the study population based on total number of FPD cases they had done in their practice. X-axis denotes the total number of FPD cases and Y-axis denotes the distribution of the students in percentage. There was a higher frequency of 6 cases(brown bar) with 21% followed by 7 cases( black bar) with 19% done by undergraduates. Only 4% of the students had performed 9(beige bar) and 10(orange bar) FPD cases.



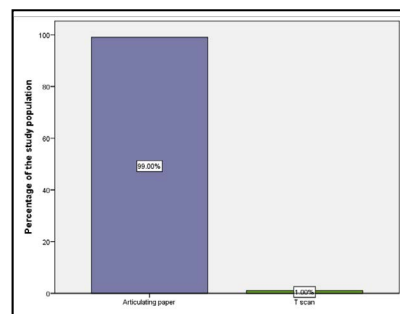
**Graph 4.** Bar chart showing the distribution of the study population based on the total number of FPD cases they had done in their practice associated with the total number of cases in which they had occlusal interferences. X-axis denotes the total number of FPD cases and Y-axis denotes the distribution of the students based on the number of cases in which they had occlusal interferences in percentage. There was a higher incidence of two(35.8%)(dark violet bar) and three(32.6%)(teal bar) occlusal interferences among students who had done FPD insertion and only 5.27% reported occlusal interferences in five cases(light brown bar). This finding was statistically significant (Chi-square; $\chi^2=74.646$ ,  $df=40$ ,  $pValue=0.001(0.05)$ ).



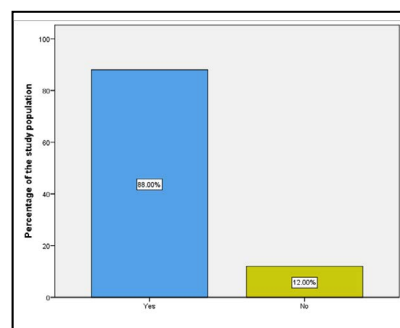
**Graph 5.** Bar chart showing the distribution of the study population who had experienced occlusal interference during FPD insertion based on frequency of the site. X-axis denotes the common site of occlusal interference during FPD insertion and Y-axis denotes the distribution of the students in percentage. The occlusal interference was more common in lower posterior (blue bar) with 45.26% followed by upper posteriors (violet bar) with 38.95%. The upper anterior (grey bar) with 9.47% and lower anterior (pink bar) with 6.32% had less occlusal interference based on undergraduate experience.



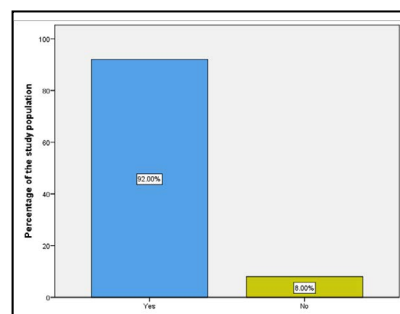
Graph 6. Bar chart showing the distribution of the study population based on the method they preferred to correct occlusal interferences. X-axis denotes the different methods students preferred to correct occlusal interference during FPD insertion and Y-axis denotes the distribution of the students in percentage. About 99% of the students preferred articulating paper (purple bar) and only 1% of the students preferred T-scan (green bar) to correct the occurrence of occlusal interference in FPD.



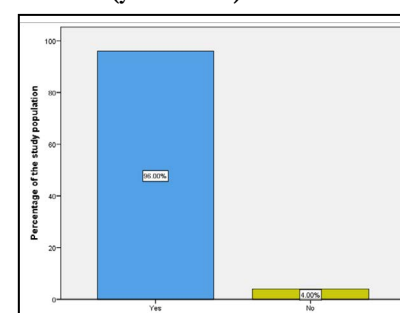
Graph 7. Bar chart showing the distribution of the study population who had reported to pre-check FPD in cast before intraoral insertion. X-axis denotes the response of the students whether they had checked FPD in a cast and Y-axis denotes the distribution of the students in percentage. About 88% of the participants reported checking FPD in a cast for fit before intraoral insertion (blue bar) and only 12% of the students reported to not pre-check their FPD in cast (yellow bar).



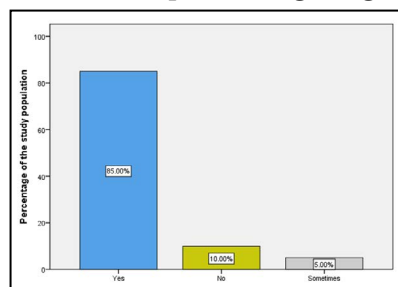
Graph 8. Bar chart showing the distribution of the study population who had reported to have taken measures in preventing occlusal interferences during FPD insertion. X-axis denotes the response of the students whether they had taken any measures to prevent occlusal interferences and Y-axis denotes the distribution of the students in percentage. About 92% of students reported having taken measures to prevent occlusal interference (blue bar) and 8% of the students reported that they didn't not take preventive measures to decrease the incidence of occlusal interference (yellow bar).



Graph 9. Bar chart showing the distribution of the study population who had reported occlusal interferences as the most common error occurring during FPD insertion. X-axis denotes the response of the students whether they considered occlusal interferences as the most common error and Y-axis denotes the distribution of the students in percentage. About 96% of the students (blue bar) reported that they have considered occlusal interference as the most common error during FPD insertion. 4% (yellow bar) of the students disagree.



**Graph 10.** Bar chart showing the distribution of the study population who had reported to glaze the FPD after occlusal correction. X-axis denotes the response of the students whether they glaze the FPD after occlusal adjustment and Y-axis denotes the distribution of the students in percentage. About 85%(blue bar) of the students reported to glaze the FPD after occlusal correction and about 5%(grey bar) reported having glazed the FPD occasionally after correcting occlusal interference. About 10%(yellow bar) of the students reported not glazing the FPD after occlusal adjustment.



benefit with cost efficiency rather than a removable prosthesis and implants [23].

Failure to achieve the desired specifications for function and aesthetics can lead to failure of the treatment and it can occur mainly due to 3 factors including biological, mechanical and aesthetic. Mechanical failure of the prosthesis is mainly due to the clinician [24]. One of such mechanical factors is occlusal interferences. Occlusion is the static relationship between the incising or masticating surfaces of maxillary or mandibular teeth or tooth analogues [6]. Any interference in the occlusal contact that disrupts the smooth excursive movement of teeth against each other is referred to as occlusal interference.

In the present study, undergraduates had done FPD cases ranging from 2-10 in their practice. However, about 95% of the participants have come across occlusal interferences. A study by Ettala-Ylitalo et.al [25] reported a higher incidence of occlusal interference among the patients treated with fixed prosthesis. Chaithanya et.al [26] reported similar findings in his study with an incidence of 70% of Occlusal interference among the study population.

In the present study, the Occlusal interference was noted more in upper posterior(38.95%) and lower posterior bridges(45.26%). This is in accordance with the study conducted by Solow et.al [27] who noted premature contacts more in posteriors. About 99% of the students preferred the use of articulating paper over T-scan to correct occlusal interference. A study by Majithia et al., [28] proved that T-scan to be a reliable tool in correcting occlusal adjustments compared to articulating paper. The higher use of articulating paper in the present study may be due to the it's easier use and time consumption of the method.

Failure to correct occlusal interference can lead to serious complications in patients. A study by Clark et al., [29] conducted that transient local tooth pain, loosening of the tooth, a slight change in postural muscle tension levels, chewing stroke patterns and clicking TMJ can be induced by occlusal interference. Previous studies by Lima et al., [30] and Ash et al., [31] reported that occlusal interferences can lead to the development of or to an increase in the severity of TMDs.

It is imperative for the clinician to check for contacts before FPD insertion. However, a proper tooth preparation and certain measures to be taken by the clinician to avoid these incidences. In the present study about 88% of the students reported to check for

occlusal discrepancies in cast before intraoral examination. About 93% of the students expected to have taken measures to prevent this occurrence.

Inadequate occlusal reduction, poor inter occlusal records and failure to provide temporary bridge contributes to the major occurrence of occlusal interferences during FPD insertion. The clinician needs to check for proper fundamental requirements of the preparation before making an impression.

This study has less sample size and is limited to certain geographical locations. For further scope of the study increased sample size with inclusion of larger geographical location would give better results.

## Conclusion

This study concludes that the occurrence of occlusal interference of FPD during insertion is much higher among dental undergraduates (95%). If this error is not corrected, it can lead to failure of the prosthesis and even causes major complications in the patients affecting their quality of life. Hence actions should be made to improve among the dental students regarding the severity of these interferences and to prevent the occurrence by following proper fundamental principles of their treatment procedure.

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