

# Awareness on the management of periodontally compromised abutments in fixed partial denture – A cross-sectional survey

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## ABSTRACT

**Background:** Periodontal health is a prerequisite of successful comprehensive dentistry. To achieve the long-term therapeutic targets of comfort, good function, treatment predictability, longevity, and ease of restorative and maintenance care, active periodontal infection must be treated and controlled before the initiation of restorative dentistry. Periodontal treatment is undertaken to ensure the establishment of stable gingival margins before tooth preparation. Non-inflamed, healthy tissues are less likely to change as a result of subgingival restorative treatment or post-restoration periodontal care. Hence, certain measures should be taken for periodontally compromised abutments in fixed partial denture (FPD). **Aim:** The aim of the study was to create awareness on the management of periodontally compromised abutments in FPD. **Materials and Methods:** A self-administered questionnaire with 15 questions will be prepared and circulated among 100 undergraduates, postgraduates and practitioners from Saveetha Dental College and Hospitals. Level of confidence and awareness was rated according to the interns and practitioners knowledge and the capacity. Data collection and analysis will be done based on frequencies and percentage values using SPSS software. **Results:** Nearly 32% of participants say that prognosis of FPD in periodontally compromised abutments is compromised, 26% of participants say fair, 25% of participants say poor, and 16% of participants say good prognosis. 42% of participants answered that bone grafting can be done in periodontally compromised abutments, 13% of them does not practice bone grafting and 41% of them were not sure about it. **Conclusion:** In the present study, the awareness rate on the management of periodontally compromised abutments in FPD among 100 undergraduates, postgraduates, and practitioners was moderate, hence to improve more knowledge and awareness certain awareness programs, dental education programs should be undertaken.

**KEY WORDS:** Bicuspidization, Cleansing aids, Hemisection, Periodontally compromised abutments, Root resection

## INTRODUCTION

Fixed partial dentures (FPDs) transmit forces through the abutments to the periodontium. Failures are due to poor engineering, the use of improper materials, inadequate tooth preparation, and faulty fabrication. Of particular concern to dentists is the selection of teeth for abutments. They must recognize the forces developed by the oral mechanism and resistance. Successful selection of abutments for FPDs requires sensitive diagnostic ability.<sup>[1]</sup>

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therapeutic targets of comfort, good function, treatment predictability, longevity and ease of restorative and maintenance care, active periodontal infection must be treated and controlled before the initiation of restorative dentistry.<sup>[2]</sup> A FPD usually requires the splinting of additional abutments to overcome the loss of bone support of an abutment. It has been contended that splinting of abutments increases their resistance to the applied force of teeth and supporting structure. Ante suggested that it was unwise to provide a FPD when the root surface area of the abutments was less than the root surface area of the teeth being replaced. This has been adopted and reinforced by others as “Ante’s law.” Ante’s law has been a clinical guideline to determine the number of abutments involved in the fabrication of a FPD. As the edentulous span of a FPD increased, increasing the number of abutments

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was recommended. There is insufficient scientific evidence to evaluate the validity of Ante's law.<sup>[3]</sup>

Replacement of missing teeth represents the largest category among patients in clinics who are looking for better esthetic and/or functional teeth. The FPD is one of the most commonly preferred definitive treatment options for a single missing tooth. For many years, FPDs were considered to be the best treatment choice for replacing a single missing tooth.<sup>[4]</sup> Fixed prosthodontics' treatment can range from the restoration of a single tooth to the rehabilitation. Single teeth can be restored to full function and improvement in cosmetic effect can be achieved. Missing teeth can be replaced with prostheses that will improve patient comfort and masticatory efficiency, maintain the health and integrity of the dental arches. Every restoration must not be able to withstand the occlusal forces to which it is subjected. This is of particular significance when designing and fabricating an FPD since the forces that would normally be absorbed by missing tooth are transmitted through the pontic, connectors, and retainers.<sup>[5]</sup>

Abutment teeth are called onto withstand the forces normally directed to the missing plane teeth, in addition to those usually applied to the abutments. The replacement of the missing teeth in the posterior region is equally important as in the anterior segment of the mouth. It is significant to determine the absolute need to fill a space and to perform a cost-benefit analysis for any designed restoration – not only in commercial terms but also in biological value to tooth structure and the surrounding tissues.<sup>[6]</sup> Periodontally compromised abutments are the one which that poor periodontal support, so one should take concern while choosing it has an abutment teeth, so to overcome those complications, certain measure and periodontal treatment suggestions should be undertaken such as splinting of an abutment tooth, root resection, hemisection, and bicuspidization and bone grafting procedures can be done to maintain the periodontal health. The purpose of this study was to analyze the knowledge and awareness level on the management of periodontally compromised abutments in FPD.<sup>[7,8]</sup>

## MATERIALS AND METHODS

### Study Design

This study design was a cross-sectional survey.

### Study Area

Dentistry is a clinical discipline that must be evidence-based and hence the need for research is important. Recent advances in all aspects of dentistry have been numerous and impressive. Dental research is experiencing dramatic progress across the world. The study was conducted in Saveetha Dental College and Hospitals among the dental interns who work in the hospital.

### Study Population

Majority of dental research in India are carried out among patients, staffs, and clinical students. This study was carried out among 100 undergraduate, postgraduates, and practitioners from Saveetha Dental College and Hospitals to assess their awareness and knowledge regarding the management of periodontally compromised abutments in FPD 32% uses clinical methods and 67% use radiographic methods to identify periodontally compromised abutments [Figure 5].

### Inclusion Criteria

The following criteria were included in the study:

- Undergraduates aged from 18 to 23 years.
- Postgraduates aged from 23 to 26
- Practitioners aged from 26 to 30 who are interested to participate in the study.

### Exclusion Criteria

The following criteria were excluded from the study:

- Undergraduate, postgraduates, and practitioners who are not interested to participate in the study.
- Undergraduate, postgraduates, and practitioners who are not available during the time of data collection.

### Ethical Clearance

Before the start of the study, ethical clearance was obtained from the Institutional Ethics Committee, Saveetha University.

### Scheduling

Data collection was scheduled for a period of 1 month from December 2018 to January 2019.

### Sample Size

The sample size was  $n = 100$ .

### Sampling

A list of undergraduates, postgraduates, and practitioners from Saveetha Dental College formed the sampling frame were included. They were randomly selected from the list until the sample size was achieved.

### Survey Instrument

A self-administered questionnaire with 15 questions was designed and circulated among 100 undergraduates, postgraduates, and practitioners [Table 1]. The study was conducted in Saveetha Dental College and Hospitals in Chennai. Level of awareness will be rated according to the confidence level and knowledge of the participants. Data collection and analysis will be done based on frequencies and percentage values using SPSS software.

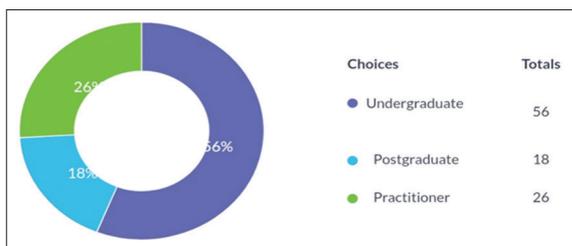
### Statistical Analysis

Descriptive statistics were done using frequency and percentages values using SPSS software.

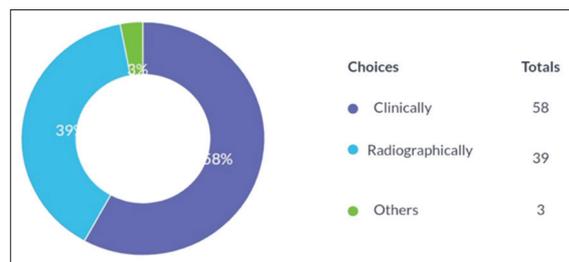
**Table 1: Questions**

**Protocol of research - A questionnaire**

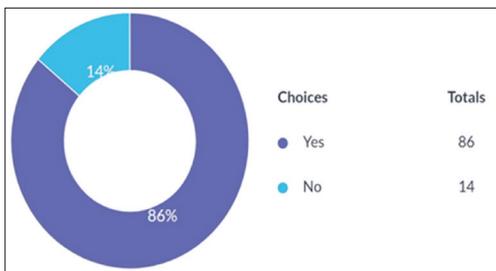
<b>Name:</b>	<b>Age:</b>
<b>Gender: M/F</b>	<b>Year of study:</b>
1) Do you practice FPD? Yes/No 2) How do you evaluate abutments for FPD? Clinically/Radiographically/others 3) What is the ideal crown root ratio for your abutments in FPD? 1:1/1:2/2:3/3:2 4) How do you identify periodontal^ compromised abutments? Clinically/radiographically/others 5) Where will you place the finish lines in case of gingival recession? CEJ/enamel/Root surface/Not sure 6) What type of finish lines will you choose in teeth with gingival recession? 7) What kind of oral hygiene measures will you recommend in periodontal compromised abutments in FPD? 8) Are you aware of root resection? 9) Do you practice root resection? 10) Are you aware of hemisection? 11) Do you practice hemisection? 12) What is the prognosis of FPD in periodontally compromised patients? Good/Poor/Fair 13) Do you advise bone grafting and other periodontal procedures in these compromised abutments? Yes/No/Not Sure 14) When will you contraindicate FPD in periodontally compromised abutments?	



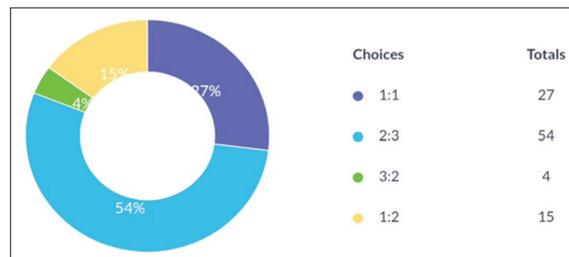
**Figure 1:** Are you practitioner or student



**Figure 3:** How do you evaluate abutments for fixed partial denture?



**Figure 2:** Do you practice fixed partial denture?



**Figure 4:** What is the ideal crown root ratio for your abutments in fixed partial denture?

**RESULTS**

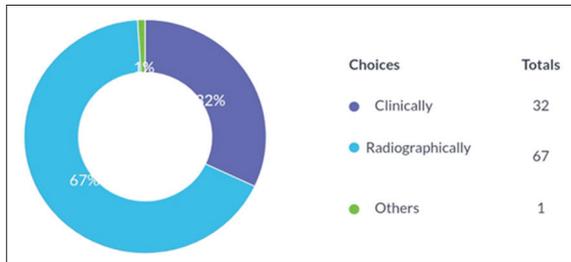
All the questionnaires administered to the 100 participants who gave their consent to participate in the study were found to be complete and analyzed. The participants were aged 18–30 years (mean = 24). Most of the participants were females. The awareness rate of participants was categorized as good/moderate/poor. Out of 100 undergraduates, postgraduates, and practitioners 56 participants were undergraduate, 18 participants were postgraduates, and 26 participants were practitioner [Figure 1]. Out of them 86% of participants practice FPD and 14% of participants do not practice FPD in their clinical practice [Figure 2], 58% of participants say that evaluation of abutments for FPD can be done clinically, and 39% of participants say that the abutment evaluation can be done radiographically [Figure 3], for ideal crown root ratio of abutments in FPD 27% of

participants answered 1:1, 54% answered 2:3, 15% answered 1:2, and 4% answered 3:2 [Figure 4]. 52% of participants say that the finish line can be placed in cementoenamel junction (CEJ) in case of gingival recession, 35% says in root surface, 20% of participants says that shoulder finish line is of choice for teeth with gingival recession [Figure 6], 33% of participants says chamfer, 34% says shoulder with bevel, and 13% says knife edge finish line. 12% of practitioners were not aware of where to place the finish line in case of gingival recession [Figure 7]. 85% of participants were aware of root resection, 15% of participants were not aware of root resection, 31% of participants practice root resection, and 69% of participants do not practice root resection in their clinical practice [Figures 8 and 9]. 86% of participants were aware of hemisection, 14% of participants were not

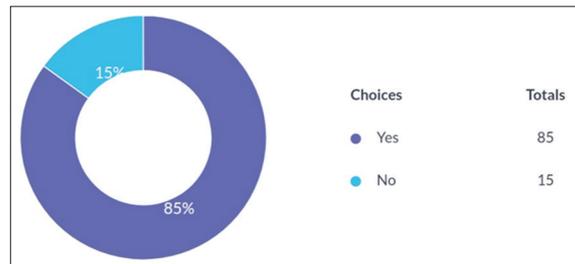
aware of hemisection, 20% of participants practice hemisection, and 79% of them does not practice hemisection [Figures 10 and 11]. 32% of participants say that prognosis of FPD in periodontally compromised abutments is compromised, 26% of participants say fair, 25% of participants say poor, and 16% of participants say good prognosis [Figure 12]. 42% of participants answered that bone grafting can be done in periodontally compromised abutments, 13% of them does not practice bone grafting and 41% of them were not sure about it [Figure 13].

## DISCUSSION

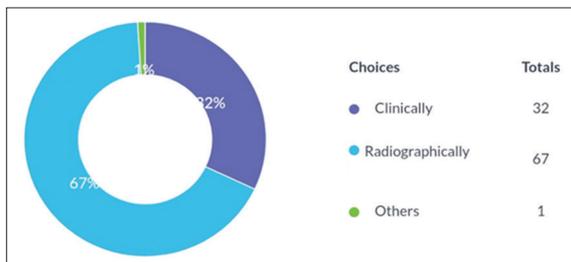
Periodontal health is a prerequisite of successful comprehensive dentistry. To achieve the long-term therapeutic targets of comfort, good function, treatment predictability, longevity and ease of restorative and maintenance care, active periodontal infection must be treated and controlled before the initiation of restorative dentistry.<sup>[9-11]</sup> Periodontal treatment is undertaken to ensure the establishment of stable gingival margins before tooth preparation. Non-



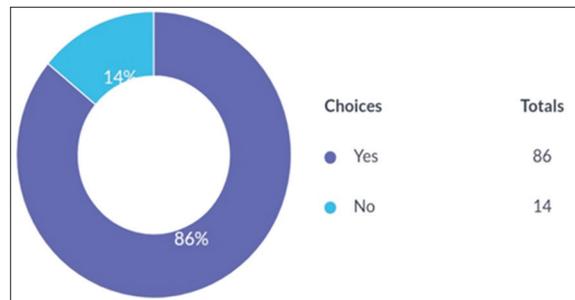
**Figure 5:** How do you identify periodontally compromised abutments?



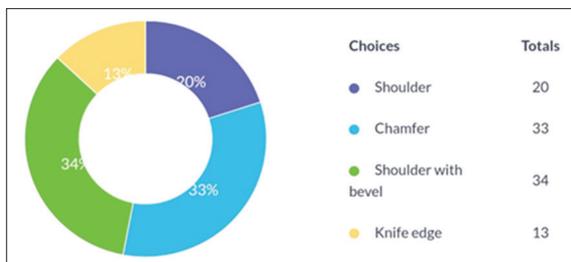
**Figure 9:** Are you aware of root resection?



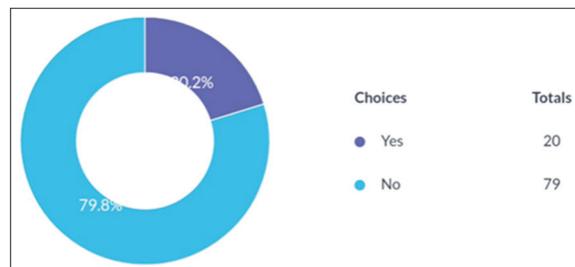
**Figure 6:** Where will you place the finish lines in case of gingival recession?



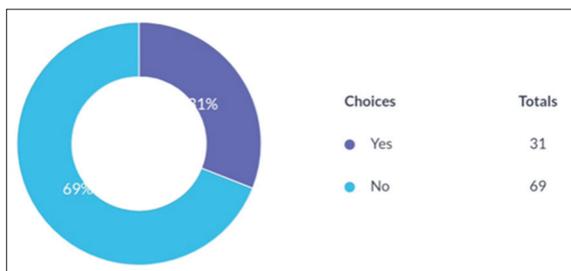
**Figure 10:** Are you aware of hemisection?



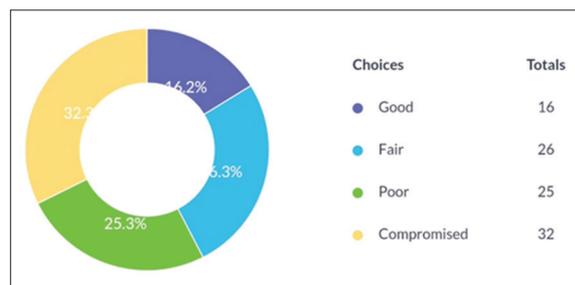
**Figure 7:** What type of finish lines will you choose in teeth with the gingival recession?



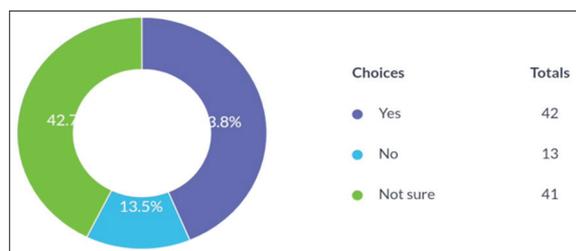
**Figure 11:** Do you practice hemisection?



**Figure 8:** Do you practice root resection?



**Figure 12:** What is the prognosis of fixed partial denture in periodontally compromised patients



**Figure 13:** Do you advise bone grafting and other periodontal procedures in the compromised abutments?

inflamed, healthy tissues are less likely to change as a result of subgingival restorative treatment or post-restoration periodontal care.<sup>[12]</sup> Certain periodontal procedures are designed to provide for adequate tooth length for retention, access for tooth preparation, impression making, tooth preparation, and finishing of restorative margins in anticipation of restorative dentistry. Periodontal therapy should follow restorative care because the resolution of inflammation may result in repositioning of teeth or soft tissue and mucosal changes. If traumatic forces applied to teeth with ongoing periodontitis, it may result in increased tooth mobility, discomfort, and possibly the rate of attachment loss.<sup>[13]</sup>

In general, preparation of the periodontium for the restorative dentistry can be divided into two phases: (1) Control of periodontal inflammation with the non-surgical and surgical approach and pre-prosthetic periodontal surgery.<sup>[14]</sup> Situations in which a tooth has a short clinical crown and is inadequate for the retention of a required cast restoration, it is necessary to increase the size of the clinical crown using periodontal surgical procedures. Surgical crown lengthening procedures are performed to provide retention form to allow for proper tooth preparation, impression procedures, and placement of restorative margins and to adjust gingival levels for esthetics.

According to studies conducted by Grossmann *et al.*, the ideal crown root ratio is 2:3, when compared to our study the response rate was 54% of participants say that 2:3 is the ideal crown root ratio.<sup>[15]</sup> In contrary to this the study conducted by Klugman *et al.*, the ideal finish line for periodontally compromised abutments is knife edge, this when compared to our study 13% of participants say that knife edge is the finish line of choice for periodontally weakened abutments in FPD.<sup>[16]</sup>

According to studies conducted by Subhashini *et al.*, the radiographic evaluation is of choice for selecting the abutment for FPD, when this was compared to our study 58% of participants say that the abutment evaluation is done clinically and 39% says radiographically.<sup>[17]</sup> The study conducted by Prasad *et al.* says that the finish line can be placed in both root surface and CEJ depending on the periodontal

health, but our present study revealed that 52% in CEJ and 35% in root surface.<sup>[18]</sup> Study presented by Shah *et al.* says that many of the participants follow hemisection and root resection in their clinical setup, but when compared to our study 85% of participants practice hemisection and root resection clinically for periodontally compromised abutments.<sup>[19]</sup> According to studies conducted by Muzzi *et al.*, periodontally compromised abutments has a poor prognosis, while the current study also says the same.<sup>[20]</sup>

## CONCLUSION

Periodontal health is a prerequisite of successful comprehensive dentistry. Hence, in the present study, the awareness rate on the management of periodontally compromised abutments in FPD among 100 undergraduates, postgraduates, and practitioners was moderate; hence, to improve more knowledge and awareness certain awareness programs, dental education programs should be undertaken. Following an increase of loss of periodontal support on periodontally compromised abutments in FPD, the measures to overcome those problems, treatment options such as splinting, hemisection, root resection, bicuspidization, and flap surgery, GTR can be done for better periodontal support.

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