

## Assessment of Periodontal Splinting Procedures Done Using Fiber and Composite Versus Wire and Composite

Research Article

Aniruddh Menon<sup>1</sup>, Nashra Kareem<sup>2\*</sup>, Jayanth Kumar Vadivel<sup>3</sup><sup>1</sup>Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamil Nadu, India.<sup>2</sup>Senior Lecturer, Department of Periodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamil Nadu, India.<sup>3</sup>Reader, Department of Oral Medicine and Radiology, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamil Nadu, India.

### Abstract

The most common indication for periodontal splinting is to improve the prognosis of mobile teeth and patient comfort and provide better control of the occlusion if the anterior teeth are mobile, which is much widely accepted by the patient rather than extensive and invasive long term periodontal surgery and regenerative procedures. The aim of the present study is to assess the Prevalence of the Fiber with composite vs wire with composite for splinting at Saveetha Dental College. Retrospective data of 281 patients was obtained and segregated. The inclusion criteria included 6-70 years age group, underwent frenectomy/frenotomy and visited between June 2019 to April 2020. Once the data was obtained it was statistically analyzed using SPSS by IBM version 20. Within the limits of the present study it is observed that the most commonly used material for splinting is wire and composite than Fiber and composite. Based on correlation and association tests a positive correlation was noticed between the type of splinting and the duration of splinting with a high statistical significance ( $p=0.001$ ). Further awareness programmes that should be conducted to bring out better clinical outcomes and help the society holistically.

**Keywords:** Splinting; Fibre; Composite; Periodontitis.

### Introduction

Periodontitis is an inflammatory disease induced by bacterial bio-films that accumulate in the gingival margin and characterized by gingival inflammation, loss of connective tissue attachment and alveolar bone [1-3]. Various systemic complications can worsen the periodontal status as well [4-5]. Removal of plaque, calculus, elimination of deep periodontal pockets and occlusal adjustment are treatment options and result in healthy periodontium but reduced height of the supporting tissues [6]. If left untreated, the continuous loss of the supporting tissues during periodontal disease progression may result in increased tooth mobility, ultimately yielding to tooth drifting and exfoliation [7-10]. Tooth mobility can also be a consequence of occlusal trauma in addition to the periodontal inflammation and attachment loss which is caused due a large group of sequential events mediated by many genetic, cellular and other chemical modulators [11].

From the clinical point of view, it is important to clarify the reason for increased tooth mobility as a result of widened periodontal ligament, reduced height of the supporting tissues or their combination [12]. Tooth mobility is a result of intra-alveolar displacement of the root and usually assessed by exposing the crown of the tooth to a certain force and determining the distance that the crown can be displaced in buccal and/or lingual direction [13]. Assessment of tooth mobility could be performed manually/digitally or with the help of instruments such as periodontometer, the laser vibrometry, Periotest and photogrammetric measurement method [14-17]. A commonly used device, Periotest, measures the reaction of the periodontium to a defined percussion force that is applied to the tooth and delivered by a tapping instrument. The Periotest values range from - 8 to + 50 where the firm teeth demonstrate values ranging from -8 to +9 and mobile ones at a range of 30 to 50 [15]. The mobility of a tooth in the horizontal direction is closely dependent on the height of the surrounding supporting bone, the width and quality

#### \*Corresponding Author:

Nashra Kareem,  
Senior Lecturer, Department of Periodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamil Nadu, India.  
E-mail: nashrak.sdc@saveetha.com

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of the periodontal ligament, and the shape and number of roots present [18-20]. Mobility could cause occlusal instability, discomfort or pain during function [21]. Occlusal instability could have negative consequences on tooth tissue relationship, including the relationship of the teeth to the opposing dentition that could lead to excessive occlusal forces [6]. The question is whether a healthy periodontium with reduced height has a capacity similar to that of the normal periodontium to adapt to traumatizing occlusal forces.

The most common indication for periodontal splinting is to improve the prognosis of mobile teeth and patient comfort and provide better control of the occlusion if the anterior teeth are mobile [22], which is much widely accepted by the patient rather than extensive and invasive long term periodontal surgery and regenerative procedures [23-29]. Periodontal splints that redistribute functional and parafunctional forces achieve stability after periodontal treatment [30]. The aim of the present study is to assess the Prevalence of the Fiber with composite vs wire with composite for splinting.

### Materials and Methods

The present study involved a total of 281 patients that underwent splinting procedures. These included all treatment modalities of splinting. The study was performed in a university setting at Saveetha Dental College and Hospitals. Thus the data obtained from the patients is of the same geographic location and ethnicity. The ethical approval for collection of retrospective data from the dental patient management archives was obtained from the Institutional Ethics Board.

The period of the study was between June 2019 to April 2020. Once the data was collected the same was verified by using photographs by two external reviewers who were blinded on the hypothesis from the present study. This was done to eliminate the chances of sampling bias. Before the commencement of the study a clear well defined inclusion criteria was defined. The inclusion criteria included that:

- Patients should have visited Saveetha Dental College during the study period.
- Patient has been treated by a resident of Saveetha Dental College, either an undergraduate or postgraduate student.
- Should have undergone splinting procedures.

- Should have been within the age group of 6 - 70 years.

Out of the study population that was chosen for the study there was no segregation process, as this would result in sampling bias. The data segregation was done according to various parameter such as speciality of clinic in which patient was treated, age of the patient, gender of the patient etc.

The data that was then tabulated was reviewed by an external reviewer and screened for internal validity of the study. The data was then exported to SPSS Software by IBM Version 20 for Statistical Analysis. Descriptive statistics was performed followed by Correlation tests to see any kind of correlation or Association between the different variables taken in the present study. Previously our team has a rich experience in working on various research projects across multiple disciplines [31-45]. Now the growing trend in this area motivated us to pursue this project.

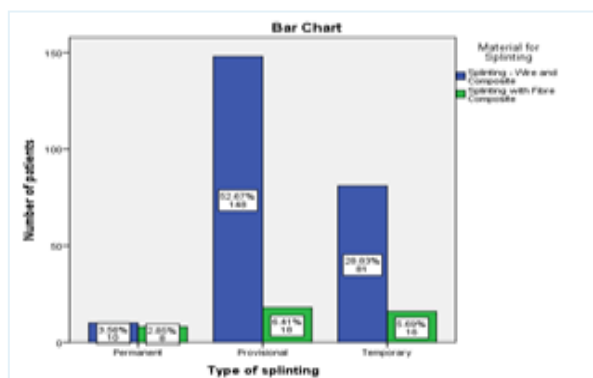
### Results & Discussion

The present study consisted of 281 patients who had undergone splinting with wire and composite, and Fiber and composite at Saveetha Dental College. Out of the entire study population, 59.1% are males and 40.9% are females. The patients were between the age group of 16-70 years with a mean age of 37.2 plus or minus 11.8 years.

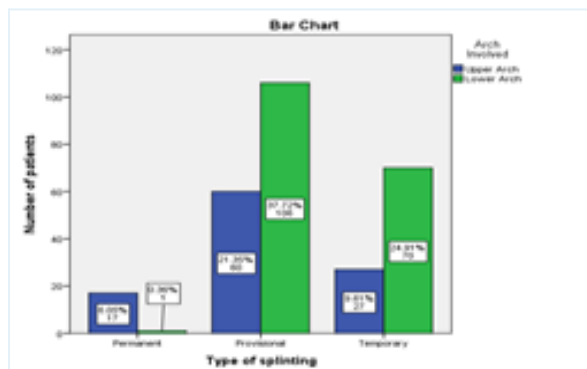
Out of the total the splinting procedures wire and composite was used 85.1% whereas Fiber and Composite 14.9%. Based on duration provisional splinting was the most widely performed type (59.1%) followed by Temporary (34.5%) and finally permanent (6.4%). Lower arch was the more commonly seen arch where splinting was performed, 63% and in the upper arch 37% was performed.

Based on correlation and association tests a positive correlation was noticed between the type of splinting and the duration of splinting with a high statistical significance ( $p=0.001$ ). There was also a strong correlation seen between the duration of splinting and the arch in which it was performed. Permanent splinting was performed more commonly in the upper arch whereas provisional and temporary splinting were performed in the lower arch. It had a  $p=0.000$  which showed high statistical significance. There

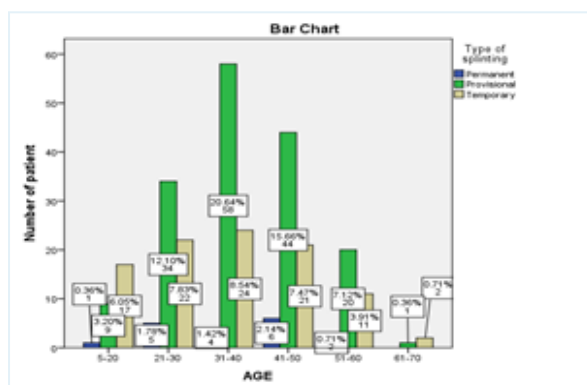
**Graph 1:** This bar graph shows the association between the duration of splinting and the material used where blue colour denotes splinting done with wire and composite and green colour denotes splinting with fibre and composite. The X axis denotes the type of splinting and Y axis denotes the number of patients having undergone the procedures. This graph denotes that the most widely preferred duration of splinting is provisional splinting and in all three durations of splinting the most commonly used material is wire and composite. Chi-square test was done and the association was found to be statistically significant. Pearson's Chi-square value = 14.702, df = 2, p value 0.001 (<0.05) hence statistically significant.  $p<0.05$ -Infers Statistically Significant association between material and duration for splinting.



Graph 2: Bar chart shows association between the duration of splinting and the different arches where blue colour denotes the upper arch and green colour denotes the lower arch. In the graph X axis denotes the type of splinting based on duration and Y axis denotes the number of patients having undergone the procedures. Permanent splinting is performed more in the upper arch than the lower arch whereas provisional and temporary splinting is performed more frequently in the lower arch than in the upper arch. Chi-square test was done and the association was found to be statistically significant. Pearson's Chi-square value = 40.696, df = 6, p value 0.00 (<0.05) hence statistically significant. p<0.05-Infers Statistically Significant association between duration of splinting and arch for splinting.



Graph 3: Bar chart shows association between the duration of splinting and the age of the patient where blue colour denotes permanent splinting, green colour denotes provisional splinting and yellow colour denotes temporary splinting. X axis denotes the age group and Y axis denotes the number of patients having undergone the procedures. Provisional splinting is more prevalent within the 31-40 years age group, permanent splinting is more prevalent in the 41-50 years age groups and temporary splinting is more common in the 31-40 years age group. Chi-square test was done and the association was found to be statistically insignificant. Pearson's Chi-square value = 15.175, df = 10, p value 0.126 (>0.05) hence statistically not significant. p>0.05-Infers no Statistically Significant association between duration of splinting and age of the patient.



was no statistical significance between age of the patient and the duration of splinting(p>0.05)

Numerous types of splints have been described in the literature, such as composite resin based ones used in conjunction with adhesive systems, orthodontic wire, wire-composite [46] or fiber reinforced composite resin [47], nylon fishing line-composite and polyethylene [48]. To the authors' best knowledge, the impact of tooth mobility on the survival of splint materials considering also the periodontal parameters have not been assessed to date. Within the limits of the present study it is observed that males undergo splinting more than females.

In a study conducted by Bhawna G et al., [49] where the prevalence of smoking was assessed on a national survey it was observed that males had more usage than females, it is a well known fact that has been documented through the ages that there is a clear relationship between smoking and its effect of periodontal health [50]. Thus this could be the reason why males undergo splinting more than females. It is observed that the most commonly used material is wire and composite as compared to fibre and composite. There are various reasons for the same. This can be attributed to the fact that there were more chances of debonding or detachment in the case of Fiber retainers as reported by

Sobouti et al., [51] in a randomised control trial. In another clinical study conducted by Aliye Akcali et al.,[52] where the clinical parameters were considered there was no difference in the clinical parameters that were measured with both these materials. There is a positive correlation between the arch and the type of material that is used, this can be attributed to the fact that there is an increased aesthetic demand when the upper arch is considered. There is an added advantage of better esthetics when Fiber and Composite is considered, thus there should be further studies and further awareness programmes that should be conducted to bring out better clinical outcomes and help the society holistically. Our institution is passionate about high quality evidence based research and has excelled in various fields [53-63]. We hope this study adds to this rich legacy.

The limitations of the present study included that it was single centered and thus all the patients were geographically isolated. Clinical parameters were not considered in accounting during the present study.

### Conclusion

Within the limits of the present study it is observed that the most commonly used material for splinting is wire and composite than

Fiber and composite. Further awareness programmes that should be conducted to bring out better clinical outcomes and help the society holistically.

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