

Evaluation of Dead Space in Post Endodontically Treated Fiber Post Cases-A Retrospective Study

Running Title: To evaluate dead space in post endodontically treated fiber post cases.

Type of study: A Retrospective study

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ABSTRACT

Background: The success of endodontic treatment is 53-96%, Depends on various factors like tooth type, preoperative apical status, method of obturation, irrigation, coronal seal permanent restoration. Grossly decayed endodontically treated teeth are often restored with post and core. Apical microleakage can lead to failure of the endodontic therapy. So the aim of this study was to measure the distance between post and residual gutta percha in cast post cases.

Material and Methods: Dental records and radiographs of patients treated with cast post cases were obtained from DIAS (From June 2019- March 2021) examined by the same examiner. Patients were categorized into three groups based on the distance between the remaining obturation material and post .

Results: A total of 753 cases were examined. Out of which cases belonged to Group I (85.10%) , Group II and Group . Within the limitation of the study, most of the cases had an average dead space of 0.1 (68%).

Conclusion: Within the limitation of the study, most of the cases had an average dead space of 0.1-2 mm (68%). The dead space occurring after a post restoration can be a good shelter for the microorganisms. So, radiographic confirmation of the post adaptation

should be performed before cementation of all kinds of posts.

Key Words : fiber Post, Dead Space, innovative technology, Endodontic Therapy

INTRODUCTION:

Recently, growing attention has been given to procedures carried out after completion of the endodontic treatment and their impact on the prognosis of devitalized teeth. These procedures may allow the passage of microorganisms and their by-products to the apical region of the root and into the alveolar bone, a potential cause of delayed failures(1,2). The consequences of these "events" may be important in determining the long-term success of the endodontic treatment(3,4). The success of an endodontic treatment is 53%-96%. However the seal provided by a complete full length of obturation gets compromised after post space preparation. Coronal microleakage into the root canal by bacteria can lead to failure of endodontic therapy(5-7). It depends on many factors like tooth type, preoperative operator skills and quality of coronal seal. The longevity of endodontically treated teeth has been greatly enhanced by continuing advancements made in endodontic therapy and restorative procedures(8,9). Endodontically treated teeth are often broken teeth which requires restoration with an endodontic post. The main purpose of the post is to retain the permanent restoration and disperse the factors along the long axis of the tooth to the periodontium. The influence of the gap between the post and the residual gutta-percha on the clinical outcome of endodontically treated teeth was studied from records of patients treated by dental students. 3 groups of teeth were compared according to the gap between the post and the residual gutta-percha. The best outcome was found in teeth where the post was in contact with the gutta-percha (83.3%); when this gap was 0- 2 mm a satisfactory outcome was found in 53.6% of the teeth, and a gap larger than 2 mm resulted in an inferior outcome, where only 29.4% of the teeth were defined satisfactory(10). A fluid filtration system was used to examine the effect of cementation of stainless-steel posts and a carbon-fiber post system on microleakage. So the aim of this study was to measure the distance between post and residual gutta percha in cast post cases.

Our team has extensive knowledge and research experience that has translate into high quality publications(11-20),(21-24),(25-29),(30)

MATERIALS AND METHODS:

Study design :- A Retrospective study

Study setting :- This retrospective study was carried out at Department Of Conservative Dentistry And Endodontic, Saveetha dental college and hospitals, Chennai

Study size :- intern and post graduates of saveetha dental college .

Sampling and scheduling :- Owing to the nature of the study design and setting, a convenience sampling method was used, and the data was collected.

Survey instrument :- A pre-tested and validated questionnaire was used to measure the baseline knowledge, attitude and practice regarding the pandemic and alternative therapies for the same.

Inclusion and Exclusion criteria :- All those who were willing to participate were included in the study. Those who were not willing and those who had a language barrier in answering the English version of the questionnaire were excluded from the study.

Ethical clearance :- Prior to the start of the study, ethical clearance was obtained from the institution ethical committee of Saveetha University.

Statistical analysis :- As this study was entirely based on data collection from existing dental records available in DIAS (Dental Information Archiving Software) Saveetha Dental College, ethical clearance was not obtained. Dental records of the patients who had undergone treatment for the management of badly broken down teeth with cast post from June 2019 to March 2021 were retrospectively examined by a single examiner Only the patient who had got their treatment done by the same clinician and full dental records were included for the study. Data were collected from 753 patient records. Following data were collected from each patient - Age, Gender, Type of teeth and the radiographs of each were evaluated for the dead space (Distance between obturating material and the post), and were broadly divided into three categories based on this into Group I,II and III. I-No gap- 0mm II-less than 2mm III-more than 2mm. Data was tabulated in excel sheets and statistical analysis was done using SPSS 25 version Descriptive analysis of the data obtained was done and Chi square test was done to check the association between Age, Gender and Number of cases. Descriptive statistics were done using frequency and percentage. Inferential statistics were done using the Chi-square test. Interpretation was based on a p value less than 0.05, which was considered statistically significant.

RESULTS AND DISCUSSION :

A total of 753 cases were examined. 85.10% of cases were grouped into group I, 14.01% were categorised under group II and 0.88% of cases were grouped under Group III. Maximum number of cases were reported in Female- 51.33% , Minimum number of cases were reported in Male- 48.67%, When the association between the age groups and the teeth was checked, it was found to be significant with P value less than 0.05 (P-Value 0.019), which is not constant with previous study (1,31)According to the study most endodontically treated teeth with fiber

post are 11,12,13 (34.81%), followed by 21,22,23 (33.19%), followed by 31,32,33 (7.37%), followed by 41,42,43 (6.93%).

According to the correlation graph of gender and commonly treated teeth number with fiber post , number of tooth commonly treated with fiber post in female are 11,12,13 (17.26%) followed by 21,22,23 and in male are 21,22,23(17.55%) followed by 11,12,13. According to study, the most common age group for endodontically treated teeth with fiber posts are the age group 20-30 years (24.48%) followed by the age group 31-40 years (21.43%). According to study group 1 was seen mostly in 20- 30 years (22.75%) followed by 31-40 years (21.68%), it was found to be not significant with P value more than 0.05 (P-Value 0.632).

Endodontically treated teeth most commonly receive post-retained restoration(10,32,33). Recently, more studies have been focussed on the coronal leakage of the post restoration. Results showed that not only the length of remaining root canal filling but also the adhesion between the post and root canal dentin played a key role in coronal microleakage. This is a retrospective study based on the evaluation of radiographs. A major drawback of this type of analysis is the impossibility of deciding whether a periapical pathosis is healing or not because of its gives only static description of the dynamic inflammatory process (34,35).

A total of 70 cases were examined. 21% of cases were grouped into group I, 68% were categorised under group II and 1% of cases were grouped under Group III On the whole, most of the cases belonged to the 21-30 age group-57%. Minimum number of cases were reported in 61-70 age group-13% Maximum number of cases were reported in Male-62%, Minimum number of cases were reported in Female-37%. When the association between the age groups and the teeth was checked, it was found to be not significant with P value more than 0.05(1)

A custom made cast post can be fabricated by direct or indirect technique. The main disadvantage of this technique is that if the selected reinforcement, i.e., the wire or plastic post is too tight, then the impression material strips away from it when the impression is removed. Furthermore, placing the reinforcement into the canal is an additional time-consuming procedure. In addition, seating the reinforcement onto the orifices of the root canals may be difficult or impractical in cases with difficult clinical access or in cases where multiple teeth are involved(36,37).

CONCLUSION:

Within the limitation of the study, most of the cases had an average dead space of 0.1-2 mm (85.10%). The dead space can be a good shelter for the microorganisms. So, radiographic confirmation of the post adaptation should be performed before cementation of all kinds of posts.

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CONFLICT OF INTEREST:

None declared.

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TABLE 1: The figure represents different groups.

GROUPS	CRITERIA FOR DEAD SPACE EVALUATION
GROUP 1	0mm
GROUP 2	Less than 1 mm
GROUP 3	Less than 2 mm

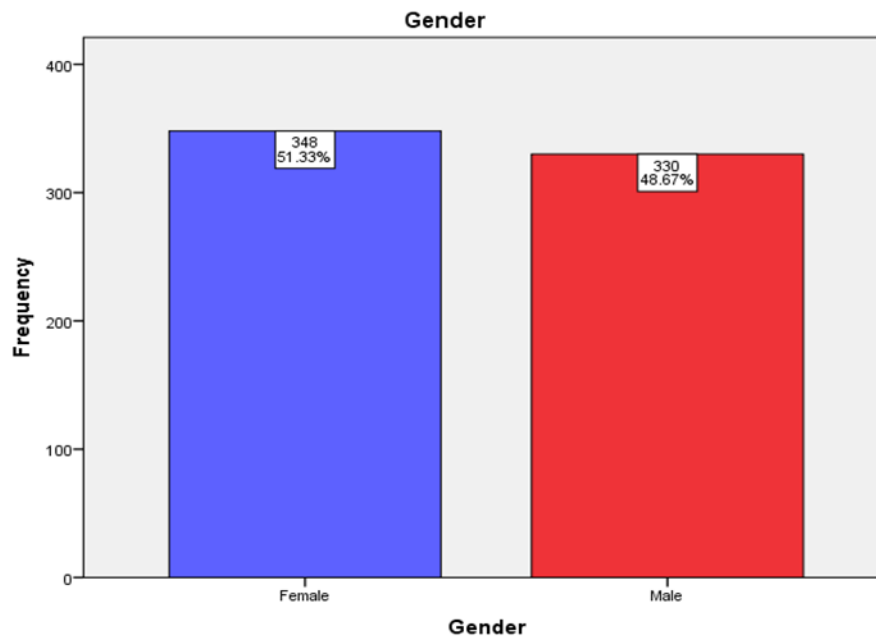
GRAPHS:

FIG 1: The bar graph shows the distribution gender, 51.33% Female and 48.67% Male, where blue denotes female and red denotes male.

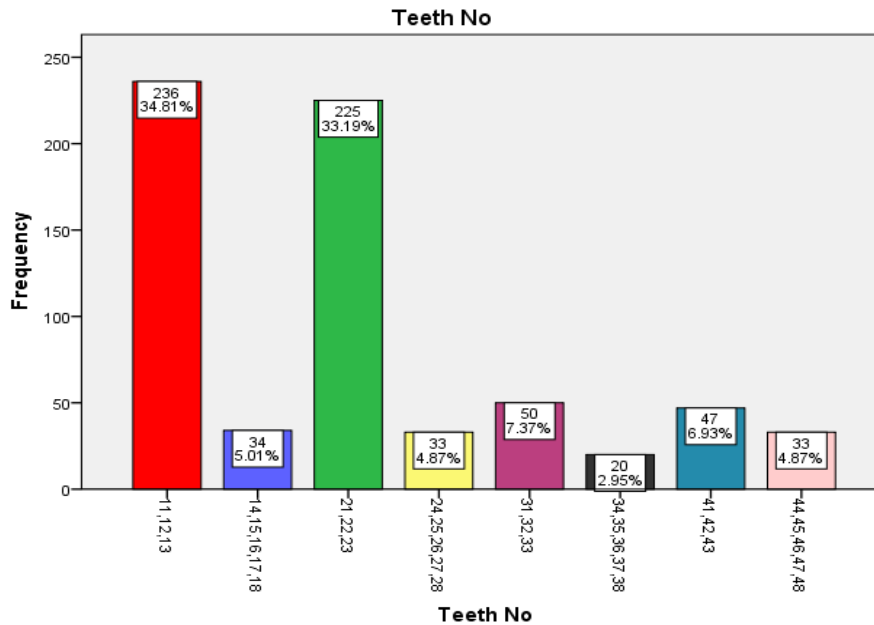


FIG 2: The bar graph shows the distribution of teeth number, where red denotes (11,12,13), blue indicates (14,15,16,17,18), green indicates (21,22,23), yellow indicates (24,25,26,27), purple indicates (31,32,33), black denotes (34,35,36,37,38), dark blue indicates (41,42,43), pink indicates (44,45,46,47,48).

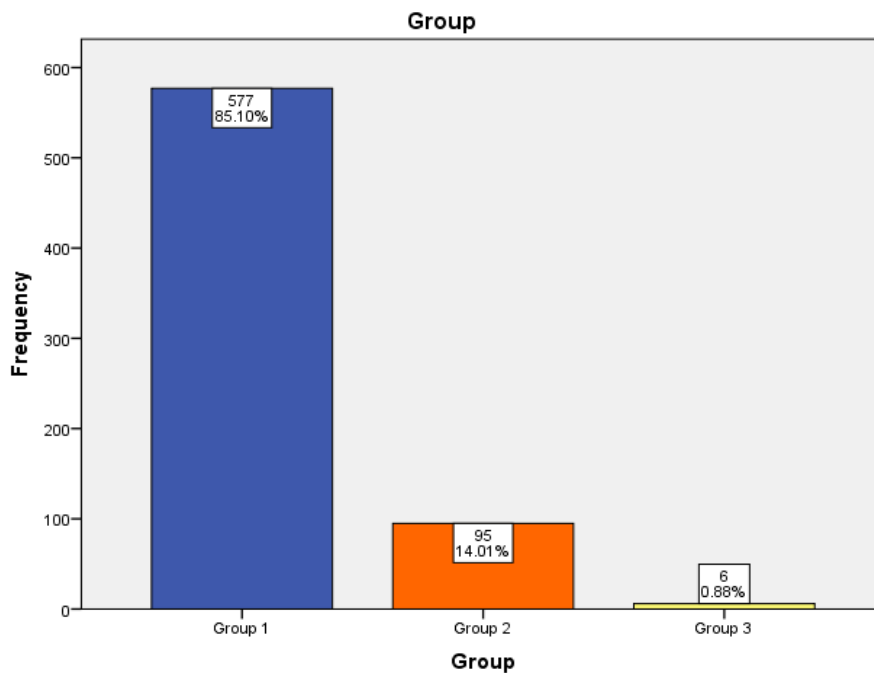


FIG 3: The bar graph shows the distribution of group, where blue denotes Group 1 (85.10%), orange indicates Group 2 (14.01%) and yellow indicates Group 3 (0.88%).

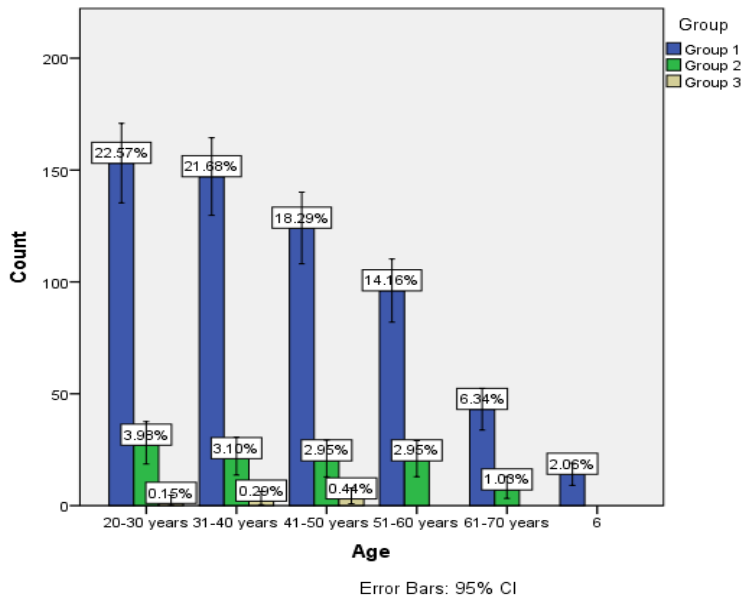


Fig 4: Error Bars help to indicate estimated error or uncertainty to give a general sense of how precise a measurement is. This is done through the use of markers drawn over the original graph and its data points. Error bars are used to display either the standard deviation, standard error, confidence intervals or the minimum and maximum values in a ranged dataset. The graph represents the association between different age groups and groups. X axis denotes different age groups and Y axis denotes count of groups . Chi-square value = 7.982; P- value =0.631(> 0.05), hence not statistically significant.

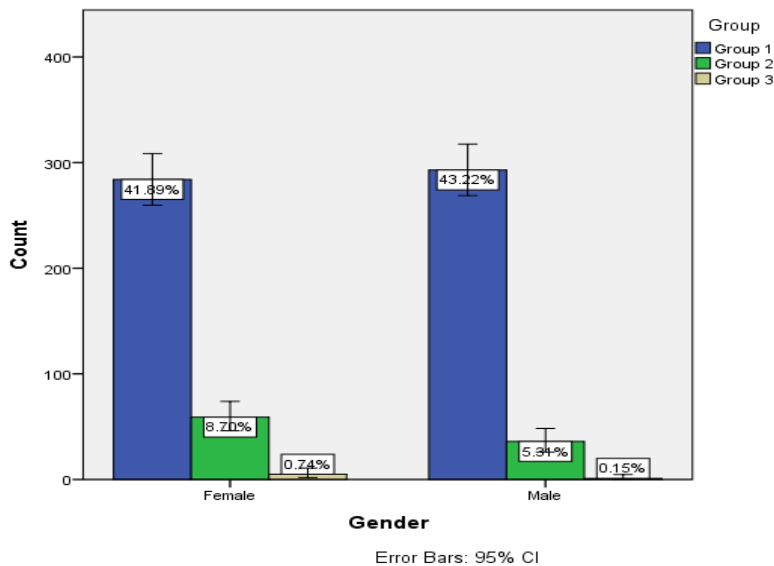


Fig 5: Error Bars help to indicate estimated error or uncertainty to give a general sense of how precise a measurement is. This is done through the use of markers drawn over the original graph and its data points. Error bars are used to display either the standard deviation, standard error, confidence intervals or the minimum and maximum values in a ranged dataset. The graph represents the association between different gender and groups. X axis denotes gender and Y axis denotes count of groups . Chi-square value = 7.903; P- value = 0.019(> 0.05), hence statistically significant.

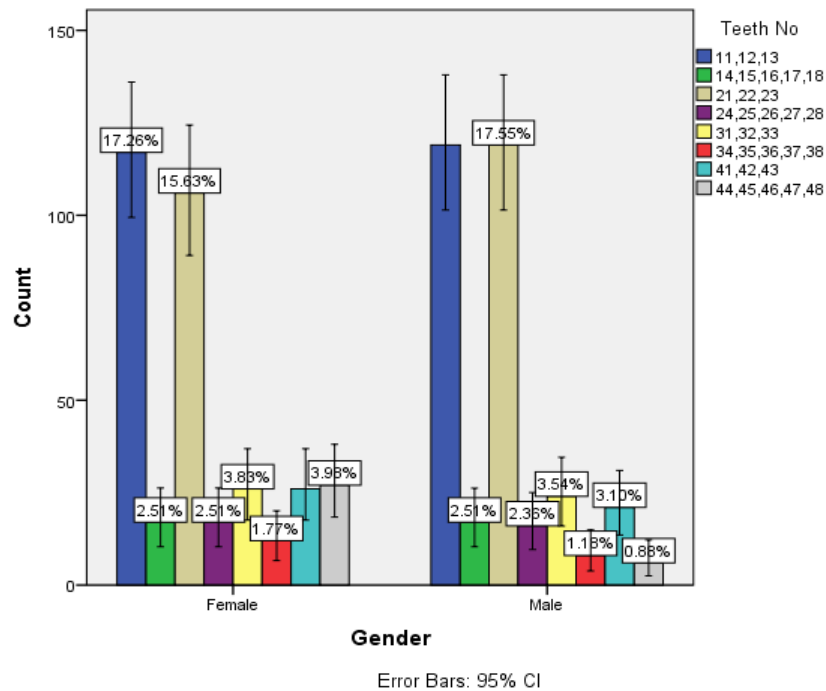


Fig 6: Error Bars help to indicate estimated error or uncertainty to give a general sense of how precise a measurement is. This is done through the use of markers drawn over the original graph and its data points. Error bars are used to display either the standard deviation, standard error, confidence intervals or the minimum and maximum values in a ranged dataset. The graph represents the association of years of gender and endodontically treated teeth number. X axis denotes gender and Y axis denotes count of endodontically treated teeth number. Chi-square value = 15.107; P- value = 0.019 (> 0.05), hence statistically significant.

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