

## **Retrospective Analysis on Patients Requiring Crown Lengthening for Post Endodontic Restoration**

**Running title:** Crown lengthening for post endodontic restoration

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### **ABSTRACT**

#### **Background:**

Post endodontic restoration is used to strengthen the restoration complex or the coronal dentin which is under the tangential stress.

**Aim:** The aim of the study is to analyse the number of patients requiring crown lengthening as post endodontic restoration

**Materials and Methods:** The data was collected from Digital Information Archiving Software (DIAS) of Saveetha Dental College. The data was collected from November 2020 to January 2021 . The data included patients who had undergone post endodontic treatment. The data was

tabulated and entered in excel and the data was analysed using SPSS package software.  $p < 0.05$  was considered to be the level of statistical significance in the study.

**Results:** Metal post was the most common post endodontic restoration given. 25.37% of the patients for post endodontic restoration had crown lengthening. . P value was  $< 0.05$ .

**Conclusion:** Crown lengthening is used as post endodontic restoration when ferrule height is needed. The longevity of the endodontically treated teeth increases in the presence of a ferrule.

**Keywords:** Crown lengthening, Ferrule effect, Post endodontic restoration, Prevalence

## INTRODUCTION:

In restorative dentistry, restoring endodontically treated teeth remains to be a difficulty (1). The use of a post and core to enhance the retention of an overlaying crown has been a typical strategy for restoring such teeth (2). However, several clinical and laboratory studies have found that putting a post in place helps to keep the core section of the tooth in place, but it weakens the root (3). Failure of post and core/crown systems is a typical problem that may be caused by differing material mechanical characteristics in response to intra-oral cyclic stresses compared to tooth structure. The recent trend in treatment decisions is more towards conservative techniques, which has been noted as adhesive dentistry has grown in popularity (4). Custom-made fibre post and core, ceramic inlays, onlays, and endocrowns have become superior options thanks to recent advancements in adhesive dentistry and the development of dental computer-aided design/computer-aided manufacturing (5).

The majority of treatment failures in endodontically treated teeth are attributable to biomechanical or restorative reasons rather than biological factors. Biological width, microleakage, and the ferrule effect are the most essential ideas in endodontic treatment teeth.

(6). The ferrule effect stops the root of the abutment from fracturing and provides resistance to dislodgement and fracture. It is the preservation of the tooth's surviving structure from breakage (7). A ferrule is a 360-degree metal collar of the crown that runs parallel to the dentine and extends from the preparation's shoulder. The ferrule stops the tooth from flexing independently. When a force is applied to a tooth, the entire tooth, consisting of the ferrule margin, core, and post complex, resists the force (8).

Our team has extensive knowledge and research experience that has translated into high quality publications (9–28). This research is needed to determine the post endodontic restoration preferred. This would be of valuable information to the oral health planners for proposing strategies for development of dental health care management.

The aim of the study was to analyse crown lengthening in patients for post endodontic restorations.

## MATERIALS AND METHODS

### Study Setting

This present study was conducted as a retrospective cross sectional study among the patients visiting Saveetha Dental College, Chennai, Tamil Nadu. The study setting was a hospital setting. The present study was ethically approved by the institutional ethical committee. The patients included in this study had visited the dental clinic and had undergone a pulpectomy. Both single visit and multi visit pulpectomies were included in the study. A total of 75000 patients records were reviewed and analysed. The age group of the patients enrolled in this study were from 1 to 12 years and they were grouped as 1 to 4 years, 5 to 8 years and 9 to 12 years of age. Sampling bias was reduced by simple random sampling. The study was done in the time period of June 2019 to March 2020. The study sample included both male and female genders but were predominantly South Indian of varied populations due to the geographic limitations.

#### Data Collection

The data collected from the patients were demographic data (Age, Gender, Address etc.). Then clinical examination was done both intraoral and extraoral. The patients had to undergo treatment of post endodontic restoration after their root canal treatment. All these records were recorded in DIAS- Dental information Archiving Software of Saveetha Dental College. Any incomplete data was verified from the concerned department or the patient. Any gross data which had the possibility of bias and could affect the studies was not included. The data was photographically registered for dentolegal documentation, communication and to improve the learning process. All the data collected was cross verified by another examiner.

#### Data Analysis

Data was entered into a spreadsheet using Excel version 16.37 (Microsoft Corp, Redmond, Wash). The data which was collected was analysed using Statistical Package for Social sciences (SPSS) software, version 1.0.0.1347 64 bit (IBM corp., NY, USA). The data was assessed by being subjected to descriptive analysis with the help of frequencies, percentages, means and the data was also analysed by running descriptive statistics in the form of crosstabs.

The type of analysis done was correlation and association. Univariate analysis was done between individual factors. A nonparametric test - Chi square test of Independence was performed using the same SPSS software to find the statistical significance of the current study.  $p < 0.05$  was considered to be the level of statistical significance.

### **RESULTS and DISCUSSION:**

In this study, we analysed retrospectively crown lengthening in patients needing post endodontic restoration. The total number of patients in the study were 536 patients with post endodontic restoration. The patients in the study had fibre post, metal post, custom post and crown lengthening as post endodontic restoration. The age of patients included in this study were above the age of 18 years.

In this present study, 53.36% of the patients were male and 46.64% were females [Figure 1]. The age distribution of the study sample was 23.88% were from 18 to 25 years, 29.10% were

26 to 35 years, 26.31% were 36 to 45 years, 20.71% were above 45 years [Figure 2]. 25.37% had undergone crown lengthening, 31.16% had fibre post, 38.62% had metal post and 4.85% had custom post [Figure 3].

When determining the long-term prognosis of endodontically treated teeth, the crown-root ratio following surgical crown lengthening is an important factor to consider (29). Periodontal status of the mouth can also affect the survival and prognosis of the post endodontic treatment(30) . Microleakage, the ferrule effect, and biological width are some of the most basic, yet crucial, elements in the care of endodontically treated teeth (6). A ferrule is a band or ring of restorative material that provides support to the crown or root of a tooth (31).When compared to ETT with an acceptable ferrule, teeth lacking a ferrule have the largest levels of variation in success/survival. (30). The presence of a ferrule has been directly linked to ETT's fracture resistance and prosthetic lifetime (32).

There are certain limitations to the study. There was a geographic limitation which had more of the South Indian population and this was a cross sectional and univariate study. The sample size and the duration of the study can be expanded for better results.

For future scope of the research larger sample size and inclusion of different ethnicity will provide better results. Longitudinal and periodic studies could be done to evaluate the status of the endodontic treatment in the patients. This study helps in giving valuable information to oral health planners for proposing strategies to help in development of dental health care management.

## **CONCLUSION**

Within the limitations of the study, we found that meta posts are more commonly used as post endodontic restoration to provide better strength. The longevity of the endodontically treated teeth increases in the presence of a ferrule. Crown lengthening is used as post endodontic restoration when ferrule height is needed.

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**CONFLICT OF INTEREST**

Authors declare no potential conflict of interest.

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FIGURES:

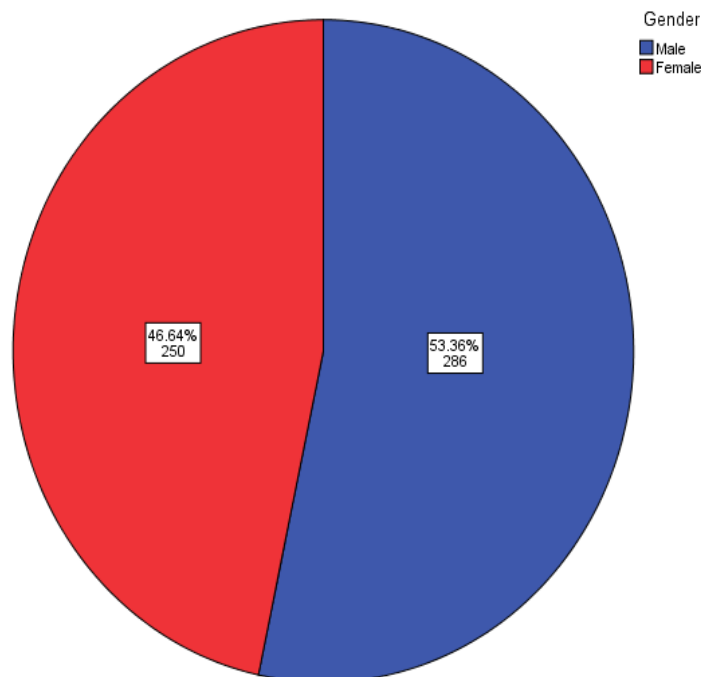


Figure 1: Pie chart showing the distribution of gender among patient requiring post endodontic treatment.

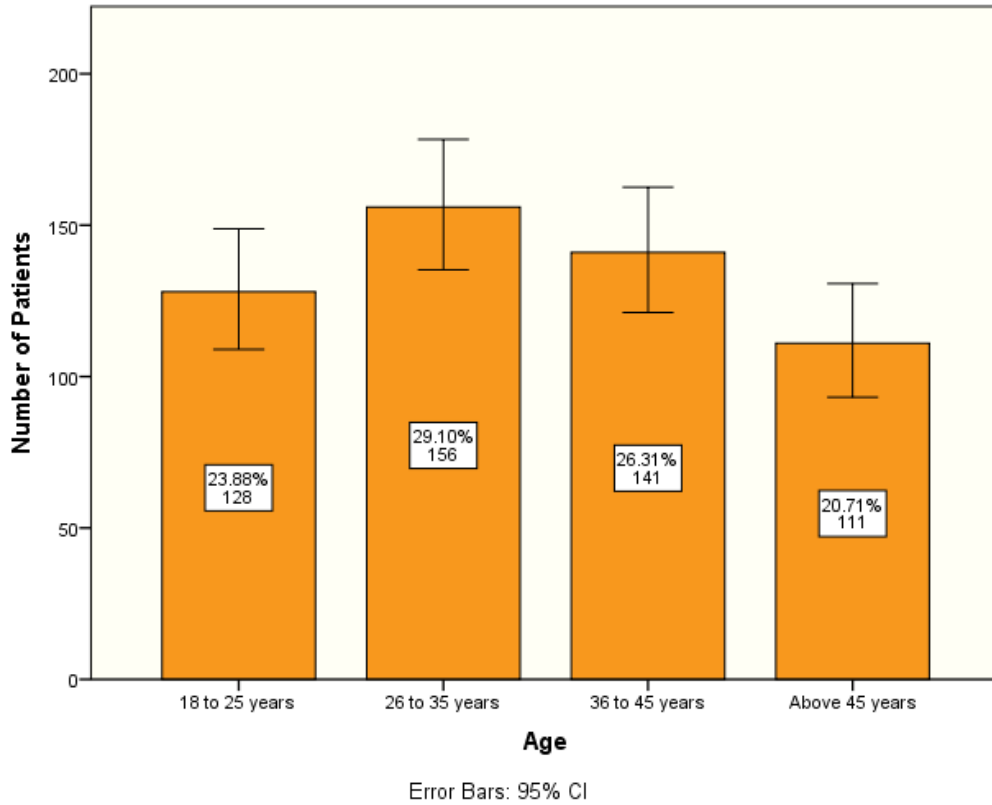


Figure 2: Bar graph showing the distribution of age of patients requiring post endodontic restoration across the scale of patient count in the y axis and age in the x axis.

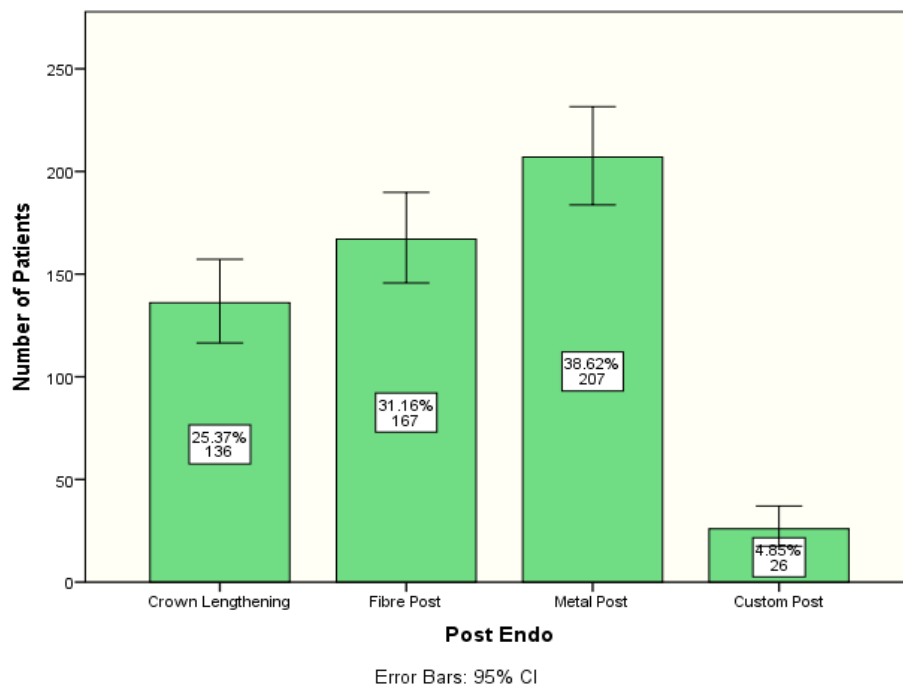


Figure 3: Bar graph showing the distribution of type of post endodontic restoration across the scale of patient count in the y axis and type of post endodontic restoration in the x axis.



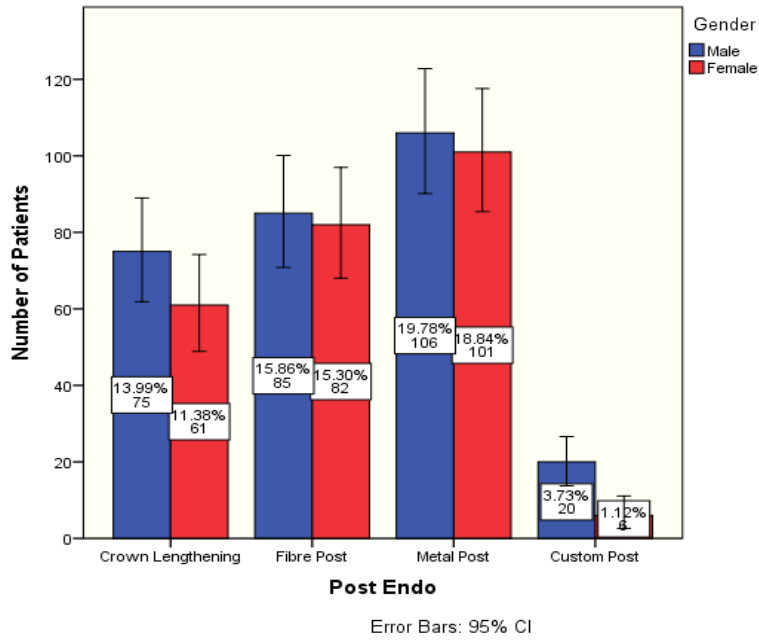


Figure 4: This bar graph represents the association between the type of post endodontic restorations and gender, where the x axis denotes the type of post endodontic resoration and the y axis denotes the gender across the scale of number of participants. The blue color represents the males and the red represents the females . Chi square test was done and was found to be statistically significant and with p value of 0.000 (p value <0.05).

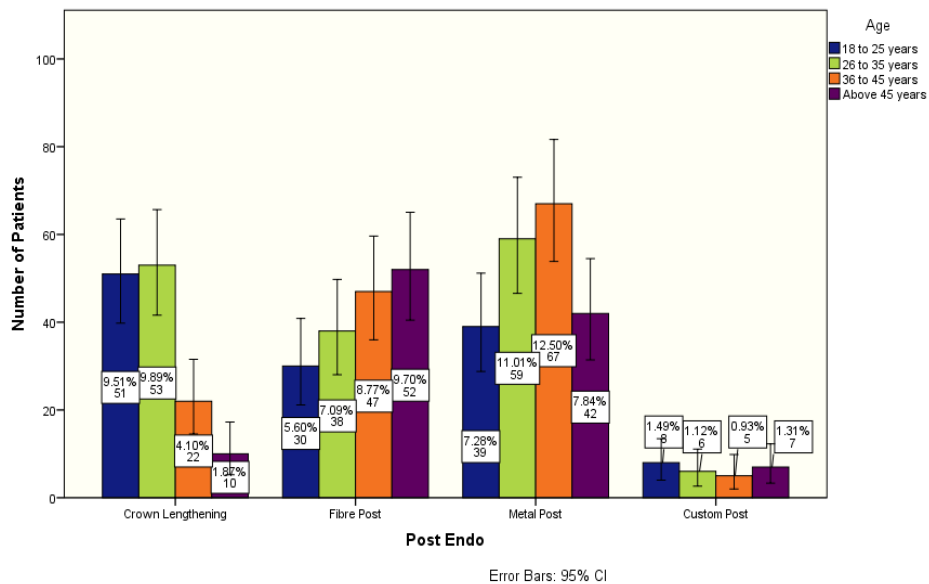


Figure 5: This bar graph represents the association between the type of post endodontic restorations and age, where the x axis denotes the type of post endodontic restoration and the y axis denotes the age across the scale of number of participants. The blue color represents the 18 to 25 years, the green represents the 26 to 35 years, the orange represents the 36 to 45 years and the purple represents patients above the age of 45 years . Chi square test was done and was found to be statistically significant and with p value of 0.000 (p value <0.05).