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Association of Age and Gender with Cast Post Restoration in Maxillary Central Incisors after Endodontic Treatment

Research Article

Preetha Parthasarathy[1], Delphine Priscilla Antony S[2*], Sreedevi Dharman[3]

[1] Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai 600077, Tamil Nadu, India.
[2] Senior Lecturer, Department of Conservative and Endodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai 600077, Tamil Nadu, India.
[3] Reader, Department of Oral medicine and Radiology, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai 600077, Tamil Nadu, India.

Abstract

Endodontically treated tooth with extensive coronal tooth structure loss, requires additional retention and is restored with post and core system. Post is a metal restorative material placed in the radicular part of the tooth and core is a substructure that replaces the coronal tooth structure.The purpose of this study is to find a correlation between age and gender in cast post restorations. The aim of this study is to evaluate the association between age and gender with cast post restoration in maxillary central incisors. The study was done in an university set up - Saveetha Dental College, Chennai. A retrospective study was conducted in patients with cast post restoration in maxillary central incisors.The data was collected from the hospital digital database by reviewing the patient's records and analysing them. Simple random sampling was done to minimize sampling bias. After reviewing, the case sheets were filtered based on data required. The final sample size was 43 patients with cast post restoration in maxillary central incisors. It was observed that, higher frequency of cast post restoration was noted in male population- 44.1% in tooth number 11 and 27.9% in 21. The age group 18-35years [39.53%] had a high prevalence of cast post restoration done in 11. The P value was found to be statistically not significant [0.917] which is >0.05. Within the limits of the study, it was observed that cast post restoration was more prevalent among male population and at the age group of 20years. The most commonly affected tooth was 11. Thus, the study can be used as a reference in understanding the most commonly affected age group with anterior teeth damage.

Keywords: Core; Post; Metal; Root Canal System; Endodontic Treatment.

Introduction

An endodontically treated tooth with extensive coronal tooth structure damage, where additional retention is required, is usually restored with post and core system [39]. A post is a metal restorative material or any other rigid restorative material that is placed in the radicular portion of an endodontically treated tooth. Core refers to a properly shaped substructure which replaces the missing coronal structure and retains the final restoration.

Endodontic posts are classified in various ways, namely the preformed and custom-made cast, metallic and nonmetallic, aesthetic and non-aesthetic [7]. The main function of a post and core is to improve resistance to lateral force by distributing the force over a large area [36].

When a post is indicated in an extensively damaged tooth, it should be placed in the largest and preferably, in the straightest canal, so that weakening of root during post preparation is avoided [17]. Distal canal in the mandibular molar and palatal canal in maxillary molar are considered for post-placement. Post type can be metallic or non-metallic. The metallic post is classified into custom cast post and pre-fabricated post and nonmetallic post are classified into carbon fibre post, fibre reinforced post and ceramic

***Corresponding Author**:
Delphine Priscilla Antony S,
Senior Lecturer, Department of Conservative and Endodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai 600077, Tamil Nadu, India.
Tel: 9790856274
E-mail: delphine.sdc@saveetha.com

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and zirconia post.

The custom-made cast post uses either gold alloys, chrome cobalt alloys or nickel chromium alloys. Advantages of a cast post system over a prefabricated post are that they are custom fit to the root configuration. They are adaptable to largely irregularly shaped canals and orifices and they can be adapted to be used with prefabricated plastic pattern [6]. The major disadvantage of cast post system is that it requires two or more appointments and temporisation between appointments gets difficult [13].

The endodontic treatment done also plays a key role in preventing further damage to the restored tooth. The type of material used in endodontic therapy is important. Extrusion of precipitate from the intracanal irrigants can lead to periapical tissue damage and inflammation [41]. In inflammatory conditions the MMP-3 levels can be high [44]. To prevent extrusion, irrigation with 5.25% sodium hypochlorite is done intermittently,1-2 mm short of apex [43]. Chlorhexidine can be used in all steps of root canal treatment due to its substantivity property [22]. Novamin is a bioactive glass that adheres to the exposed dentin and forms a mineralised layer thus preventing further progression of the dental caries [29].

The study was carried out to find a correlation between age and gender in cast post restorations. Previously our team has a rich experience in working on various research projects across multiple disciplines. (Jain, 2017 [14]); (Varghese, Ramesh and Veeraiyan, 2019 [45]); (Ashok and Ganapathy, 2019 [2]); Padavala and Sukumaran, 2018 [23]); (Ke et al., 2019 [18]); (Ezhilarasan, 2018 [9]); (Krishnan et al., 2018 [19]); (Ezhilarasan, Sokal and Najimi, 2018 [11]); (Pandian, Krishnan and Kumar, 2018 [25]); (Ramamurthy and Mg, 2018 [32]); (Gupta, Ariga and Deogade, 2018 [12]); (Vikram et al., 2017 [49]); (Paramasivam, Vijayashree Priyadharsini and Raghunandhakumar, 2020 [48]); (Palati et al., 2020 [24]); (Samuel, Acharya and Rao, 2020 [38]). Now the growing trend in this area motivated us to pursue this project.

The aim of the study is to evaluate association of age and gender with post-restoration in maxillary central incisor after endodontic treatment.

Materials and Methods

Study Setting:

This study was based on data collected from the digital database of Saveetha Dental College and Hospitals. Patient's records were reviewed and analyzed between June 2019 to March 2020. The study protocol was approved by the Institute Review Board under ethical approval number SDC/SIHEC/2020/DIASDATA/0619-0320. Two examiners were included in the study.

Sampling:

Data was collected retrospectively over a nine month period spanning from June 2019 to March 2020. Cross verification of data for error was done by additional reviewers and by photographic evaluation. Simple random sampling was done to minimize sampling bias. After reviewing, the case sheets were filtered based on data required. The final sample size was 43 patients with cast post restoration in maxillary central incisors.

Data collection:

The data was entered in the system in a methodical manner. For the present study, patient's records were obtained from the hospital digital database .The data was entered in excel manually and imported to SPSS for analysis. Chi-square test was performed. The level of significance was set at 0.05. Incomplete data was excluded from the study.

Analytics:

IBM SPSS Software [Version: 23 IBM Corporation NY USA] was used for data analysis. Descriptive statistics which included frequency of distribution was used for analysis.

Results & Discussion

The collected data was entered in SPSS version 23 and variables were assigned. Chi square test was used to tabulate the result. From the collected data, it was observed that cast post restoration was done in maxillary central incisors that were more common in male population. It was found that tooth number 11 had a prevalence of male population-44.1% and in female population it was 23.2%. In tooth number 21, the prevalence in males was 27.9% and in females were 4.6%. [Table: 1 Graph: 1].Association between age and cast post restoration in maxillary central incisors was studied. It was observed that the age group 18-35 years had more incidence of cast post restoration done in 11 [39.53%] [Graph:2]. The mean age group observed was 34.67 years. The P value was found to be insignificant >0.05 [Table: 2].

From the present study, it has been observed that male population

Figure 1: Bar graph showing association between gender and cast post restoration in maxillary central incisors [11, 21]. The X axis denotes gender and Y axis denotes number of patients with cast post restoration. It is observed that male patients had more prevalence of cast post restoration done in tooth -11 [blue] than in tooth - 21 [green]. However, the association was not statistically significant [Pearson Chi square value- 1.914, df-1, p value-0.166: p>0.05.

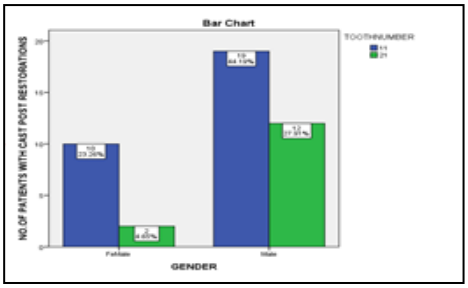


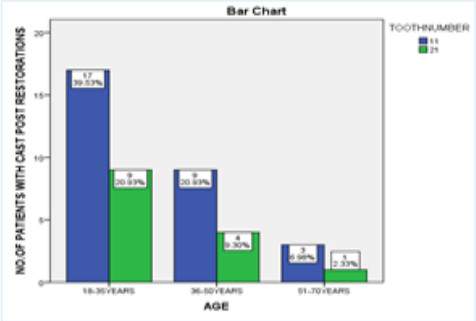
Table 1: The table shows frequency distribution between males and females who had undergone cast post restorations in maxillary central incisors [11, 21]. It was observed that males had a higher prevalence of cast post restoration in maxillary central incisors [72.1%].

Gender	Tooth number-11	Tooth number-21	Total
Female			
Count	10	2	12
% of total	23.30%	4.70%	27.90%
Male			
Count	19	12	31
% of total	44.20%	27.90%	72.10%
Total			
Count	29	14	43
% of total	67.40%	32.60%	100%

Table 2: The table shows Pearson Chi-square analysis of gender of the patients with cast post restoration in maxillary central incisors. Asymptotic significance value obtained was 0.166. Thus, the Chi- square test shows P value to be statistically not significant [>0.05].

Statistical analysis	value	df	Asymptotic significance [2-sided]
Pearson Chi-Square	1.914	1	0.166
Likeli-hood ratio	2.072	1	0.15
N of valid cases	43		

Figure 2: Bar graph showing association between age and cast post restoration in maxillary central incisors [11,21]. The X axis denotes age and Y axis denotes number of patients with cast post restoration. It is observed that patients in the age group of 18-35 years had undergone cast post restoration in 11 [blue] than in 21 [green]. However, the association was not statistically significant [Pearson Chi square value- 0.173, df-2, p value-0.917].since p >0.05.



had a higher frequency of cast post restorations, 44.1% in 11 and 27.9% in 21. This can be related to increased incidence of trauma to the maxillary anterior teeth due to their exposed position in the dental arch [4]. More incidence of cast post restoration done in the female population was seen in 11-23.2%. The age group 18-35 years had prevalence for 11- 39.53%.

In shashikala K et al's study, the mean age observed was 37.17 years which is in accordance to the present study [40]. Maria A et al, in their study, has found that female prevalence observed was 64.3%, whereas in males the prevalence was 35.7%. The mean age group was 52.5 years [1]. The present study is in contrast to Maria A et al's study. Our study shows high prevalence noted in male population and the mean age group to be 34.67 years.

Markins B et al., has observed that the female population had an incidence of 50.6% and males had 49.4% incidence of cast post restorations. The mean age group was found to be 50.1 years [3]. The current study shows a contrast; the prevalence was more in male population with mean age 34.6 years.

Pentzfeldt A et al., in their study, studied that the frequency of fracture of cast post restoration was more in male population-24% and in females it was 13%. (Peutzfeldt, Sahafi and Asmussen, 2008) 28. In a study conducted by Ennesto B et al, the gender difference was found to be statistically insignificant and did not affect the outcome of the study. The mean age was 63.9 years (Ernesto Borgia, Rosario Barón and José Luis Borgia, no date) which is in contrast to our study.

Few studies have discussed various technologies and techniques used in endodontic therapy such as in the management of dental traumatic injuries [16], techniques adapted in intra canal medicament usage [20]. Few studies have shown that grape seed extract has better remineralizing effect [46].

The efficiency of ProTaper universal and Protaper Next was studied, and was found to cause higher thinning of root dentin [33]. In few studies, the pulse oximeter was found to be more accurate followed by cold and heat testing [15]. The usage of Endoactivator has shown to have lesser post-operative pain among patients [31].

Considering the previous literature, the present study is not in accordance with it. The difference can be attributed to limited sample size and other factors such as longevity of tye material, fracture resistance was not assessed. Therefore, further studies with large sample size and other parameters to be carried out for better view on the prevalence.

Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018 [27]; Ramesh et al., 2018 [34]; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018 [34]; Ezhilarasan, Apoorva and Ashok Vardhan, 2019 [10]; Ramadurai et al., 2019 [30]; Sridharan et al., 2019 [42]; Vijayashree Priyadharsini, 2019 [47]; Chandrasekar et al., 2020 [5]; Mathew et al., 2020 [21]; R et al., 2020 [35]; Samuel, 2021 [37]). We hope this study adds to this rich legacy.

Conclusion

Within the limits of the study, it was observed that the cast post restoration was more prevalent in male patients [72.1%] and the commonly affected tooth was 11. The age group 18-35 years had more frequency of cast post restorations done in tooth 11.

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