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EVALUATION OF DIFFERENT POST ENDODONTIC RESTORATIONS USED IN ENDODONTICALLY TREATED MAXILLARY AND MANDIBULAR MOLARS

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ABSTRACT

Dental caries and trauma are two main causes for pulpal inflammation or infection for which root canal treatment is carried out. These conditions cause moderate to severe loss of tooth structure which is restored using post endodontic restorations like post and cores. The post provides intracanal retention of the core and crown restoration and distributes functional loading over a large area to achieve favourable stress distribution in endodontically treated teeth. The two commonly used post and core systems for posterior teeth includes prefabricated metal post and custom made post. The aim of this study is to evaluate various post endodontic restorations practiced for maxillary and mandibular molars.

For this study, data of all post endodontically treated maxillary and mandibular molars from June2019 to March2020 was extracted from the patient management software of saveetha dental college,Chennai. The retrieved data was evaluated by 2 reviewers. Parameters like age,gender and tooth number were noted and correlation between these parameters was studied using chi square tests.

The study showed no statistically significant difference in the use of prefabricated metal post and custom made posts in maxillary and mandibular molars[p value > 0.05(chi square test)]

Prefabricated metal posts were seen more commonly placed in the age group of 18-30 years with equal distribution among the two genders while custom made posts were commonly placed in the age group of 31-40 years and was commonly distributed among females.

KEYWORDS : Custom made post; Post and core systems; Post endodontic restorations;Prefabricated metal posts.

INTRODUCTION

Root canal treatment (RCT) is carried out in teeth with deep caries with pulpal involvement, iatrogenic pulp exposures, physiological changes, management of hypersensitivity that cannot be controlled with desensitizing agents or lasers and teeth subjected to dental trauma like Ellis Class III fracture and avulsion[1-

6].These conditions cause loss of tooth structure.The root canal treatment carried out for these teeth would cause drying out of the teeth as well as change in collagen cross linking of dentin,thereby compromising the strength of the tooth[7,8].Prior to initiating RCT, a thorough clinical examination has to be done along with assessment of tooth vitality. The ideal testing device for tooth vitality would be pulse oximeters which can be used even in calcified teeth unlike other devices which might give false negative results in such cases[9,10].One of the fundamental aspects of endodontic therapy is cleaning and shaping[11].In addition to instrumentation, irrigants such as sodium hypochlorite with EDTA or chlorhexidine are often used as initial and final rinses to disinfect the areas that cannot be accessed[5, 12-14].However, care has to be taken while using a combination of irrigants such that they do not compromise esthetics and the seal achieved during obturation[15] .The final stage of RCT is obturation which is followed by post endodontic restoration that can range from the coservative techniques like restoration with post and core systems, composites, bleaching, veneering to the traditional approach of providing full veneer crowns[16-18].Endodontically treated teeth become brittle and become susceptible to fracture[19-22].Some authors believed loss of tooth structure to be the major cause for fracture susceptible of tooth and in such cases use of a root retained/post and core restoration would reinforce or strengthen the tooth[21-23]. However,other studies believed post retained restorations to further weaken the tooth due to loss of radicular dentin during post space preparation[24-27].

A thorough clinical evaluation of the tooth has to be carried out prior to RCT which includes evaluation of the number of walls and the remaining tooth structure .In case of moderate to severe loss of coronal structure,post and core restorations are planned.
The post has two fold functions:
A. It provides intracanal retention of the core and crown restoration.
B. Distributes functional loading over a large area of the remaining tooth structure to achieve favourable stress distribution[28-29].
There are two commonly practiced post and core systems for posterior teeth.Prefabricated post and custom made post.Prefabricated posts are fast,cheap and easy to use,but do not ideally adapt to the root canal as they are supplied in preformed designs and not as per the canal anatomy[30].A custom made post is fabricated from a mold taken from the post space because of which it closely adapts to the root canal walls[31].Thus the choice of post endodontic restoration relies on the clinical assessment of tooth structure and its probable prognosis.
The aim of this study is to evaluate various post endodontic restorations practiced for maxillary and mandibular molars.

MATERIALS AND METHODS

A university setup was selected for this study which provided easy accessibility to data and provided a population of similar ethnicity for this study.There were 2 reviewers to analyse the data that was retrieved.

Data of post and core restored maxillary and mandibular posterior was retrieved between June 2019 to March 2020 from the patient management software of saveetha dental college,chennai.Data of all maxillary and mandibular molars restored with post and core was included for this study.Teeth with post and core treatment left incomplete or teeth restored direct restorative materials were excluded from the study.The duplicate entries were removed. An excel sheet was tabulated for the same which recorded the age, gender and the tooth included for post endodontic restoration .

After entering the data in SPSS software, the variables were verified and frequency distribution tables were prepared.Correlation of tooth number with age and gender was carried out for both prefabricated metal posts and custom made posts and the statistical significance was evaluated using Chi square test.

RESULTS AND DISCUSSION

The choice of appropriate post material is crucial to successful restoration. Many studies have been designed to assess the success of various post retained restorations. The use of metal posts have been objected to and the use of fiber posts were encouraged due to the high failure rates like root fractures and debonding with metal posts[32-34]. On the other hand, there are also studies that there is no significant difference in root fractures between metal and fiber posts[33]. However metal posts show higher resistance to fracture and are believed to have more or less similar survival rates as fiber posts[35].
In this study, the parameters assessed were age, gender and the type of tooth for both prefabricated metal posts and custom made posts.

The retrieved data had 217 molars restored with prefabricated metal posts and 4 molars restored using custom made posts.Correlation was done between the type of tooth with age and gender for both prefabricate metal and custom made posts.

The correlation was done using a chi-square test which showed no statistical significant difference in the use of prefabricated metal posts and custom made posts with age and gender.[p value>0.05(chi square test)]
This study evaluated the different post endodontic restorations used for maxillary and mandibular molars and their correlation with age and gender.There are no such similar studies in literature.

Prefabricated metal post

In our study, the frequency of placement of prefabricated metal posts in different age groups was studied,it was noted that individuals mostly in the age group of 18-30 years received prefabricated metal posts.The frequency of placement of these posts were more among males and in mandibular molars.

Correlation of age with tooth number was done (Figure 1) which was statistically insignificant.Most of the molars restored with prefabricated metal posts belonged to the age group of 18-30 years.This could be attributed to the increased incidence of caries in the adolescent period[36].

Correlation of gender with tooth number showed no significant difference with almost equal distribution of post and core restored molares among males and female.(Figure 2)

Custom made post

On framing frequency distribution tables,the frequency of placement of custom made posts in molars was seen to be common among the age group of 31-40 years.Most of the custom made posts were seen to be placed in females and in mandibular right molars.

On correlating tooth number with age,no statistical significant difference was seen but most of the molars with custom made posts were seen in the age group of 31-40 years.(Figure 3).Statistically insignificant results were also seen when tooth number and gender were correlated (Figure 4).Molars restored with custom made posts were more frequently seen in females than in males.
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Therefore the choice of the post used for post endodontic restoration depends on the degree and the direction of the forces exerted on the teeth to be restored, amount of tooth structure remaining and also on the type of adhesive used for its retention[37-41].

The limitations of this study were small sample size which made it impossible to generalise the results to a larger population and the outcome of these post and core restored molars were not assessed.

CONCLUSION

Although there was no statistical significant difference in the placement of prefabricated metal post and cast posts with tooth number,age and gender,it was noted within the limitations of this study that prefabricated metal posts were more commonly placed in the age group of 18-30 years with more or less equal distribution among males and females while cast posts were more commonly seen in females of the age group 31-40 years.

Further studies can be carried out to assess the durability and modes of failure of these post Endodontic restoration.Also,the amount of the tooth structure at the time of post placement and their survival rates can also be corrected.

AUTHOR CONTRIBUTIONS

All authors have equal contribution in bringing out this research work.

CONFLICT OF INTEREST

Nil

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9. GRAPHS AND TABLE

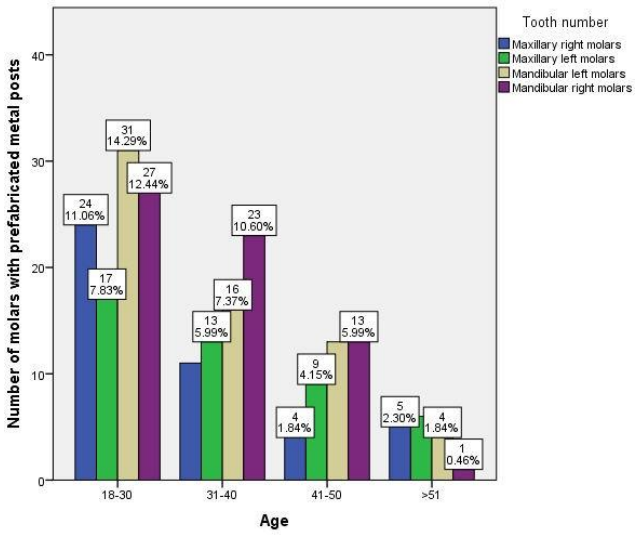

FIGURE 1:Depicts the frequency of placement of prefabricated metal posts in molars of individuals with different age groups. In this graph, blue colour represents maxillary right molars, green represents maxillary left molars, ivory denotes mandibular left molars and purple represents mandibular right molars. Here X axis represents the age of the individuals included in this study and the Y axis indicates the number of molars that have received prefabricated metal posts. It is seen that mandibular molars are the most common teeth to receive prefabricated metal posts in all age groups with 14.29% in the age group of 18-30 years; 10.60% in the age group of 31-40 years and 5.99% in the age group of 41-50 years. Chi square test showed no significant difference in the placement of prefabricated metal posts among the age groups (p value- 0.220).

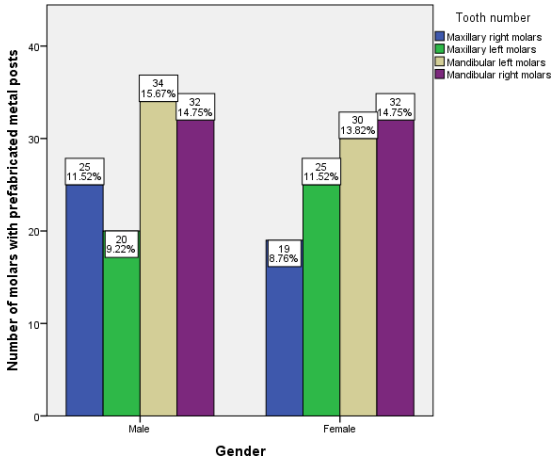

FIGURE 2:FIllustrates the frequency of placement of prefabricated metal posts in different molar teeth and gender. In this graph, blue represents maxillary right molars, green represents maxillary left molars, ivory represents mandibular left molars and purple denotes mandibular right molars. Here, X axis represents the gender of the subjects included in this study and Y axis represents the number of prefabricated metal posts placed in maxillary and mandibular molars. It is seen in the graph that the frequency of placement of

prefabricated metal posts is more in mandibular left molars in males (15.67%) and in mandibular right molars in females (14.75%). The Chi square test shows no statistically significant difference in the placement of prefabricated metal posts among the two genders (p value- 0.680).

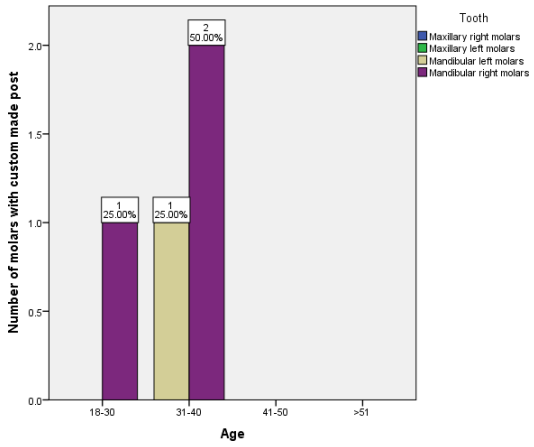

FIGURE 3:This graph depicts the frequency of placement of custom made posts in posterior teeth of different age groups. In this graph, purple denotes mandibular right molars and ivory represents mandibular left molars. Here, X axis indicates different age groups of individuals included in this study and Y axis represents the number of molars that have received custom made posts. This graph shows 25% of custom made posts being placed in the age group of 18-30 years and 75% in the age group of 31-40 years. Chi square test shows no statistically significant difference (p value- 0.750)

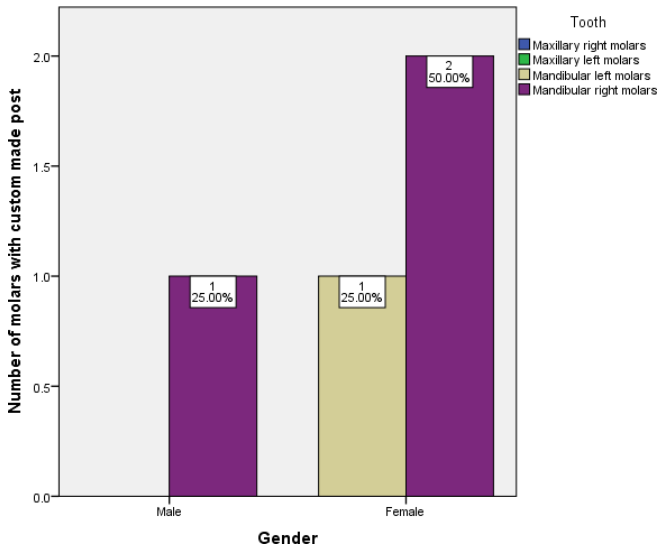

FIGURE 4:This graph illustrates the frequency of placement of custom made posts in different molar teeth and genders. In this graph, purple denotes mandibular right molars and ivory represents mandibular left molars. Here, X axis denotes the genders of the individuals included in this study and the Y axis represents the number of molars that have received custom made posts. This graph shows that the frequency of placement of custom made posts is 25% in males and 75% in females. Chi square test shows no statistically significant difference in the placement of custom made posts among the two genders (p value- 0.750).