



Incidence Of Accessory Canals In Maxillary Molars Under 25 Years Of Age And Its Association With Gender.

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ABSTRACT

The field of medicine is an ever changing science undergoing continuing tremendous development. A better understanding of art and science of endodontics have accelerated the introduction of various treatment modalities that has made the field flourish in the aspect of prognosis of different dental problems. Root canal treatment on a global basis has reported to be increasing as well, hence in this current scenario it is important for the clinician to have a thorough knowledge regarding the root canal anatomy and morphology for a successful treatment outcome. In this study we have attempted to assess and understand the influence of accessory canals in maxillary molars under 25 years of age and its influence on gender. The study was carried out in a university setting where the patient records were reviewed and analysed and a data of 86000 patients between June 2019 and March 2020 was collected and compiled, reviewed, tabulated, and exported to the Statistical Product and Service Solutions (SPSS) software for statistical analysis. A statistically significant data was not obtained from the study, but the data has remarkable clinical significance. Within the limitations of the study it has been found that 8% of the total entries analysed were indicated with accessory canals and a future extensive research involving a larger data will help in the diagnosis and treatment planning for the root canal of maxillary molars.

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INTRODUCTION

The field of endodontics demands precise and faultless knowledge regarding the root canal morphology while planning for a root canal treatment. The knowledge regarding the complexities of the root canal system will have a huge impact on the success rate of the treatment which is delivered by the clinician. Endodontic treatment has a predictable nature and its success rate is reported up to 86-98% . As we know that the failure of a treatment depends on a wide variety of factors. The factors which are believed to influence the success rate of endodontic treatment are:

- Presence of intracanal and extracanal bacteria.
- Inappropriately filled canals- canals that are poorly cleaned and obturated.
- Extrusion of the filling material.
- Improper sealing.
- Untreated canals- missed canals and accessory/lateral canals.
- Poor access cavity design.
- Complications of instrumentation [1-4]

Sadia et al., has stated that missing out on a canal during an endodontic treatment is not very common and it has been stated that at times it might have been due to an inadequate canal opening which makes it difficult for the dentist to locate all the accessory canals [5-8].

Some of the studies have reported that the failed endodontic treatments are in relation to a high incidence of accessory canals and the filling rate of the canal is low [9]. Few studies have cited that using techniques such as dental microscopes, cone beam tomography have increased the success rate of endodontic treatments Previously we have focused our research on various invitro and invivo studies. [10-29] We have currently shifted our focus to this retrospective analysis.[30,31].

MATERIALS AND METHODS

The study was conducted in a university setting, by reviewing data of 86000 patients who visited college within a time period of June 2019 to March 2020 and two reviewers were included in the study. The advantages of the study was the data belongs to the people of similar ethnicity and the limitations of the study was the trends in other locations were not assessed. The study included all the patients with maxillary molars who have registered for root canal treatment in the university, the patients with the age of above twenty five and those with missing maxillary molars were excluded from the study. A total of two hundred and ninety eight entries were finalized. The data was tabulated by using Microsoft Excel software and exported to SPSS for

statistical analysis. The statistical analysis was conducted by Chi-square test.

RESULTS AND DISCUSSION

Out of the two hundred ninety eight individuals taken for the study, two hundred and sixty eight respondents did not have accessory canals. Thus we had come to the conclusion that in the total population, 10.07% of the respondents have shown the presence of accessory canals and in 89.93% of the respondents the accessory canals were absent.

The age group of the respondents taken for the study were in the range of ten to twenty five years. Children coming in the teenage spectrum were further divided into two, eleven to fifteen years of age and sixteen to twenty years of age. The incidence of accessory canals was found to be the highest within the age group of 21 to 25, that is 18 patients out of the total 30 patients belonged to this age group. This was followed by 16 to 20 years of age where 8 patients reported to have an accessory canal in the maxillary molar. The least number was found in the age group of 10 to 15 where 4 patients were reported to have accessory canals (Figure 1).

The accessory canals were found to be mostly on the maxillary left first molar when compared to other molars, since 14 maxillary left first molars were found to be with accessory canals.

9 maxillary right first molars were found to be with accessory canals followed by 5 maxillary left second molars and the lowest incidence was seen in the maxillary right second molar which accounted for 2 teeth (Figure 2).

Within the age group of 21 to 25 which indicated the highest incidence of accessory canals out of the total population, the tooth which marked the maximum accessory canals was maxillary left first molar (26), in the same age group it was followed by maxillary right first molar and maxillary left second molar. In the age group of 16 to 20, the incidence was seen the most in maxillary left first molar followed by maxillary right second molar and maxillary right first molar with the same frequencies. The 10 to 15 years of age group showed the maximum incidence in maxillary right first molar followed by maxillary left first and second molar with the same frequency (Figure 3).

The male population represented a mark predominance in having accessory canals when compared to the female population. Within the male population the tooth which indicated the presence of accessory canals the maximum times was maxillary left first molar followed by maxillary right first molar, maxillary left second molar, and maxillary right second molar respectively. In the female population an equal

incidence was presented by maxillary right first molar and maxillary left first molar (Figure 4).

From the vast data collected and the graph generated according to this data we have come to the conclusion that out of the total one hundred and seventy eight males, one hundred and fifty four of them were without accessory canals and in twenty four of them showed the presence of accessory canals. Out of the one hundred and twenty female respondents six respondents were identified to have accessory canals, and one hundred and fourteen females were devoid of accessory canals in the maxillary molars.

Through the study conducted it can be concluded that the majority of the population who had undergone the root canal treatment were males. But several studies have pointed out that more root canal treatments were done to female patients than male patients owing to the fact that female patients tend to retain more natural teeth [32–35]. One of the reasons behind the percentage of women undergoing root canal treatments being more than men is because men tend to refrain from taking medical help when compared to women [36]. Many studies on periodontal diseases in the human population have shown that men are more prone to the disease when compared to females which often leads to tooth/teeth loss and hence root canal treatments would not be required in such cases [37]. Other systemic factors like diabetes are shown to be more dominant in males than in the female population. This in turn can be a predisposing factor for an increased rate of tooth loss in men [38,39].

The reason behind considering maxillary molars for our study was because several studies conducted on root canal treatments on various populations across the length and breadth of the world have shown that the tendency of undergoing root canal treatments was higher in the case of maxillary molars followed by anterior teeth and mandibular molars [40,41]. Root canal treatments are usually conducted in the age group of twelve to sixty four years. Some of the studies have shown that within this broad age group the majority of root canal treatments are done within the age groups of thirty five to forty four years [42].

At the same time however, there are studies which have shown that root canal treatments are done between the age group of twenty to twenty five years and it can possibly be due to several geographical factors as well as high occurrence of dental caries among young adults [43]. Farrell et al., has also denoted that the highest number of root canal treatments were done in the age group of twenty one to thirty years [44]. From our study we have seen a maximum percentage of root canal treatments within the age group of twenty one to twenty five as our study population was between

the ranges of eight to twenty five years of age. From our study it is seen that maximum root canal treatments are done in the maxillary first molar followed by the second molar. However several studies have also shown that the most susceptible tooth to undergo a root canal treatment was mandibular second molar due to dental caries in the same [45,46].

Regarding the prevalence of accessory canals, we have seen from the study that a small percentage of the population had shown the presence of accessory canals. Even though the sheer percentage of population with accessory canals was small, still it has high clinical significance.

In a study conducted by taking into account five thousand six hundred sixteen molars which have undergone re-root canal treatments, the main reason for the failure of the initial treatment was found to be because of the clinicians inability to locate the MB2 canal and this has in turn led to decrease in the prognosis of the teeth [47]. Another prospective study involving one thousand one hundred endodontically failed teeth conducted by Hoen and Pink also suggested that the missed canals were the reason behind 42% of failed root canal treatments [48].

In our study we have seen that out of all the accessory canals, the more prominent were the MB2 canals. Some studies have shown the incidence of mesio buccal 2 canals in maxillary molars ranging from 18 to 96.1% [47,49,50]. There are also cases which have reported seven to eight root canals in the maxillary molars [51,52]. According to Ingle and our present study it can be concluded that the maxillary molars represents a wide plethora of anatomical and morphological variations and accessory canals being the most common among them [53].

CONCLUSION

Knowledge of basic dental anatomy holds a very huge value for good endodontic treatment success rates. When a root canal treatment is indicated it is very important for a clinician to know about the morphology and anatomy of the root. Maxillary molars being one of the most important teeth which have the susceptibility of undergoing root canal treatment the clinician should be aware of all possible accessory canals that can occur associated with it. In our study we have observed that males tend to have more accessory canals when compared to females and the incidence of accessory canals is seen to be high in maxillary right first permanent molars.

AUTHOR CONTRIBUTIONS

Author 1 (Chithralekha B), carried out the retrospective study by collecting data and drafted

the manuscript after performing the necessary statistical analysis. Author 2(Dr.Adimulapu Hima Sandeep) aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. Author 3(Dr.Madhulaxmi M) has participated in the study design, and has coordinated in developing the manuscript.All the authors have discussed the results among themselves and contributed to the final manuscript.

CONFLICT OF INTEREST

There are no conflicts of interest to declare.

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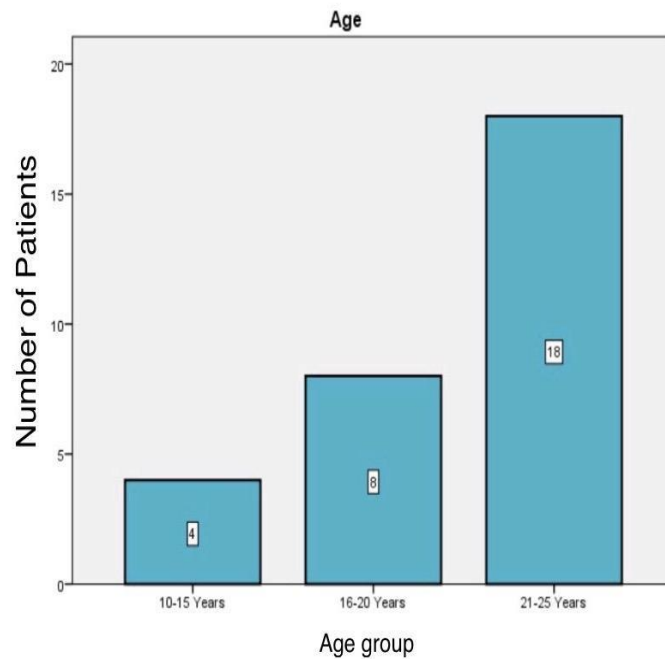


Figure 1 depicts the graph distribution of different age groups of the patients with accessory canals. X axis represents the distribution of age group and Y axis represents number of patients. The maximum number of patients with accessory canals were seen in the age group of 21 to 25years when compared to others.

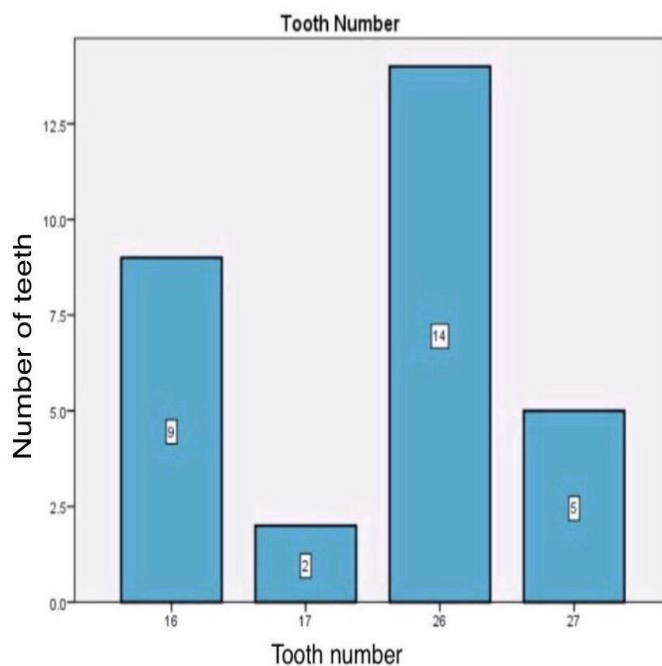


Figure 2: depicts the distribution of the number of various teeth with the incidence of accessory canals. X axis represents the distribution of the type of teeth and Y axis represents number of teeth with accessory canals. This graph shows that incidence of accessory canals was highest in 26(teeth number) compared to others.

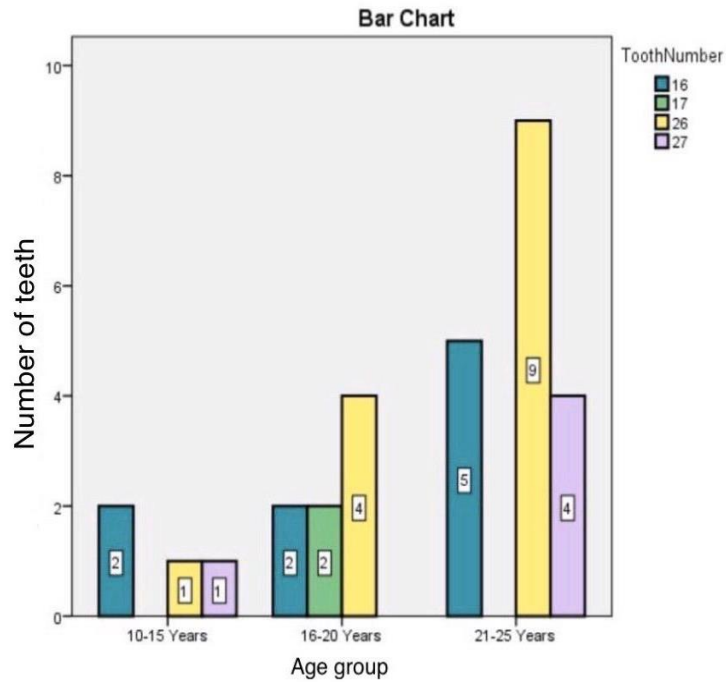


Figure 3:depicts the association between the different age groups and incidence of accessory canals in various teeth. X axis represents the age group and Y axis represents the number of teeth with accessory canals within each age group. The highest incidence of accessory canals was found to be in 26 in the age group of 21 to 25 years compared to others. Pearson’s Chi square value:8.427, DF:6, p value:0.20, that is it is not significant ($p>0.05$).

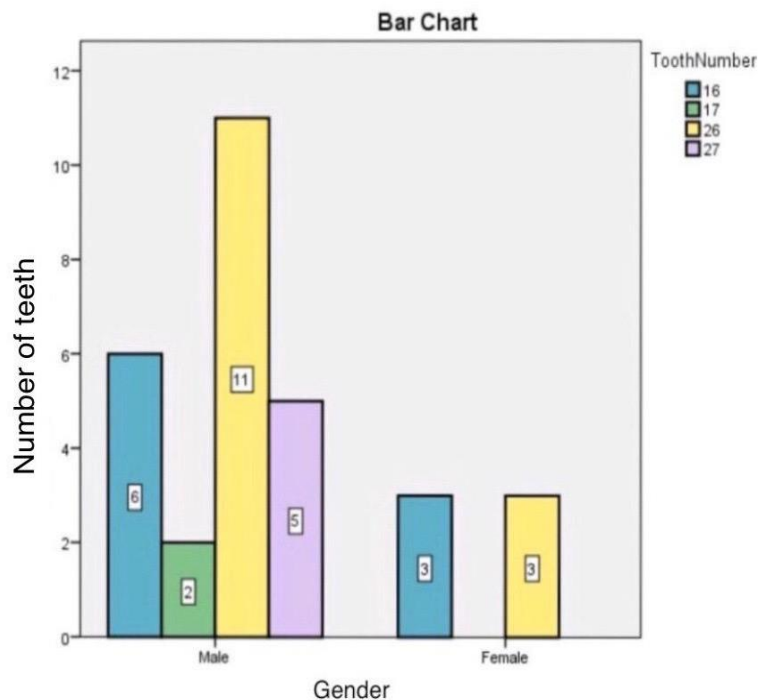


Figure 4:depicts the association of gender with the incidence of accessory canals. X axis represents the gender and Y axis represents the number of teeth with accessory canals found in each gender. The incidence of accessory canals was higher in males (teeth number 26) when compared to the female population. Chi square test was done, Pearson Chi square value: 2.768, DF: 3, p value: 0.42, proving that it is not statistically significant ($p>0.05$).