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Association of age and gender among patients undergoing root canal treatment in mandibular first molars

HARRITA.S[1], PRADEEP S[2]*, SENTHIL MURUGAN P[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India
[2]Reader, Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India
[3]Associate professor, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India
*Corresponding Author
Email ID: 151501013.sdc@saveetha.com, pradeeps@saveetha.com, senthilmuruganp.sdc@saveetha.com

Abstract: Mandibular first molars are the first permanent tooth to develop, they usually have five cusps mesiobuccal, mid-buccal, mesiolingual, distobuccal, and distolingual. International notion of numbering system the right mandible first molar is known as 46 and the left first mandibular Molar are known as 36, they usually have two roots and three canals or sometimes four and also they have four pulp horns usually since they are first to develop they are more prone to decay. Thus the aim of the study is to evaluate the association between age and gender of patients undergoing root canal treatment in a mandibular first molar. A retrospective university setup study where the data were collected from the record management system, where 86000 case sheets were revived and analyzed out of which 609 collected data was compiled and statistically analyzed using SPSS version 23.0. When statistically analyzed on the basis of gender male 47.3% had undergone endodontic treatment in mandibular left first molar (36) and 52.7% had undergone endodontic treatment in mandibular right first molar (46), and in female 42.9% had undergone endodontic treatment in mandibular left first molar (36) and 57.1% and undergone endodontic treatment in mandibular right first molar (46), no significant difference observed ($p>0.05$). Accordingly when viewed on the basis of age group 18 to 30 years had the maximum number of root canals done in mandibular first molar. The male patients have undergone more endodontic treatment in mandibular first molar compared to female patients, however, no significant difference seen ($p>0.05$).The mandibular first molars are the first to erupt in the oral cavity and are primary load-bearing teeth during clenching and mastication and in this study, most endodontic treatments were done in patients of younger age group reveals the poor maintenance and poor knowledge of people about the maintenance of the same. Thus it is important to create more awareness about the maintenance of oral hygiene and the use of dental floss to clean interdental areas.

Keywords: Endodontic treatment, Mandibular first molars, Retrospective study, Root canal treatment, Mandibular Molars

INTRODUCTION

The mandibular first molar usually has two well-defined roots, mesial root with flattened mesiolingual and widened mesiobuccal canal and the distal root is mostly straight and wide and usually has one round canal [(Pablo *et al.*, 2010),(Skidmore and Bjorndal, 1971)]. Certain specific ethnic groups are found to have variations in the number of canals [(Berman and Martin Berman, 1938)]. An isthmus is a pulpal passage connecting two or more canals [(Kohli, 2009)]. Florates et al. state that class V Isthmus is common in the mesial root of mandibular molars [(Floratos *et al.*, 2017)].

Root canal morphology has been classified by.wiene et al [(Weine *et al.*, 2012)],Kuttler et al [(Pineda and Kuttler, 1972)],Vertucci et al [(Vertucci, 1984)]. Mandibular molars are proven to have several modifications in their canal morphology. Mandibular first molars are the first permanent tooth to erupt in the oral cavity; it is more prone to dental caries and has a higher chance of proceeding to dental caries with pulpitis [(Gleiser and Hunt, 1955)]. Study of root canal system configuration of the first mandibular molar includes plastic resin injection [(Kartal and Cimilli, 1997)],radiographs with files [(Kartal and Cimilli, 1997; Ng *et al.*, 2001)],retrospective evaluation of radiographs[(Lim and Webber, 1985)],SEM evaluation[(Rwenyonyi *et al.*, 2009)],CT[(Sperber, Sperber and Moreau, 1998)],SCT[(Hazar, Sağlam and Hazar, 2017)],MCT[('Korean

Society of Computed Tomographic Technology', no date)],CBCT [('Korean Society of Computed Tomographic Technology', no date; Matherne *et al.*, 2008)].

Root canal treatment can be done both in single and multiple visits. The choice of single- versus multiple-visit root canal treatment for infected teeth is in dispute. Traditionally, root canal treatment or endodontic treatment was performed in multiple visits, with medication between root canal preparation and obturation, which mainly aims to reduce or eliminate microorganisms and their by-products from the root canal system before obturation. Multiple-visit root canal treatment is well-accepted as a safe and common therapy [(Sathorn, Parashos and Messer, 2009)]. However, in recent years, there is a growing concern about the necessity of multiple appointments in endodontic treatment because no significant differences in antimicrobial efficacies have been reported between the single- and multiple-visit treatments [(Kvist *et al.*, 2004)]. The adoption of clinical procedures in endodontic therapy depends not merely on their efficacy or biological consequences but also on the minimization of patients' discomfort. Research focusing on issues relevant to the treatments or techniques aimed to provide evidence to support clinical decisions [(Imura and Zuolo, 1995)].

Discomfort after endodontic treatment can be categorized into short-term, medium-term, and long-term. Compared with the multiple visit approach, the prevalence of short-term post-obturation pain was significantly lower in single-visit treatment [(Siqueira, 2003)]. Post-obturation pain is considered to be related to several factors including infection, retreatment, preoperative pain, intracanal medications, and physical and chemical damage to periapical tissues. The lower incidence of post-obturation pain in single-visit root canal treatment might be attributed to immediate obturation, thereby to avoid passage of medications, repeated instrumentation, and irrigation. Moreover, a single-visit approach might also prevent the occurrence of pain resulting from the reinfection of the canals as a consequence of bacterial ingress from a leaky temporary restoration or lateral canal. On the contrary, the multiple-visit technique involves the placement of a temporary seal and the repeated physical and chemical stimulation to periapical tissues. Thus this study aims to evaluate the association between age, gender and Endodontic treatment done in mandibular first molar.Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J *et al.*, 2018; Menon *et al.*, 2018; Prabakar *et al.*, 2018; Rajeshkumar *et al.*, 2018, 2019; Vishnu Prasad *et al.*, 2018; Wahab *et al.*, 2018; Dua *et al.*, 2019; Duraisamy *et al.*, 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran *et al.*, 2019a; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma *et al.*, 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi *et al.*, 2020; Samuel, Acharya and Rao, 2020)

MATERIALS AND METHOD

Study settings

This study is a university setting study conducted in Saveetha Dental College, Chennai. Approval from the ethical committee was obtained. Two examiners are involved in this study.

Sample Collection

In this retrospective study, a total of 86000 case sheets were reviewed out of which Data was collected from June 2019 and March 2020. Totally 609 case sheets were reviewed. Cross verification of data for errors was done by the presence of additional reviewers and by photographs. Simple random sampling was done to minimize sampling bias. The study was generalized to the South Indian population.

Data collection/Tabulation

Data of patients who underwent Root canal treatment in the mandibular first molar was collected from the record management system of the college. Data was entered in excel in a methodological manner and imported to SPSS. Incomplete data were excluded from the study.

Analysis

IBM SPSS 23.0 software was used for data analysis. Independent variables include age, gender, tooth. The dependent variable is Root canal treatment in the mandibular first molar. Both descriptive and inferential statistics were done. Frequency distribution was done for age, gender. Chi-square test is done to find the association.

RESULTS AND DISCUSSION

In this study, 47.6% of male patients had undergone root canal treatment in 36 and 52.7% had undergone root canal treatment in 46 and 42.9% of female patients had undergone root canal treatment in 36 and 57.1% had undergone RCT in 46. (Figure 1) Chi-square test was done to evaluate the association between gender and the endodontic treatment done in mandibular molars which were not statistically significant ($p>0.05$) (Table 1) . Distribution of root canal treatment among patients of various age groups are as follows age group 18-30 years (307), age group 31-40 years (139), age group 41-50 years (99), age group 51 years and above (6) had undergone RCT in mandibular first molars (Figure 2), Chi-square test was done to evaluate the association

between different age groups and the endodontic treatment done in mandibular molars which was not statistically significant (p>0.05) (Table 2)

In the study it is observed that male patients have undergone more root canals in mandibular first molar predominantly in mandible right first molar, this is similar to a study conducted by S yew et al on the Chinese population [(Yew and Chan, 1993)]. Many variations in the root canal morphology prove to be a task for endodontists while performing endodontic treatments.

The hard tissue repository of the human dental pulp takes on numerous configurations and shapes. Thorough knowledge of tooth morphology, careful interpretation of angled radiographs, proper access preparation, and a detailed exploration of the interior of the tooth are essential prerequisites for a successful treatment outcome. Magnification and illumination are aids that must be utilized to achieve this goal. From the early work of Hess to the most recent studies demonstrating anatomic complexities of the root canal system, it has long been established that root with a tapering canal and a single foremen is the exception rather than the rule. Investigators have shown multiple foramina, additional canals, fins, deltas, intercanal connections, loops, 'C-shaped' canals, and accessory canals. Consequently, the practitioner must treat each tooth assuming that complex anatomy occurs often enough to be considered normal. The dentist must be familiar with the various pathways that root canals take to the apex. The pulp canal system is complex and canals may branch, divide, and rejoin [(Walker, no date)].

Many studies were conducted to determine the root canal morphology of mandibular molars, in a study by about 46% of mandibular first molars had four canals [24]. Sometimes the first mandibular molar can be a Radix endo molaris and may have many roots and canals. Holtzmann et al state the dynamic concept of the root canal system, describing a variable morphology of multiple root canals interconnected by anastomoses, has been established as the prevailing state in mandibular molars, in his study mandibular first molar with five root canals, of which three were located in the mesial root. A third middle root canal was found between the mesiobuccal and mesiolingual root canals [(Barker *et al.*, 1974)].

This study can be used as a base and the cons in the study are the small sample size limitation of population group to south Indian population this can be altered and done on large-scale.The in-vitro studies conducted at our university were [(Siddique and Sureshbabu, 2019),(Hussainy, Nasim and Thomas, 2018),(Teja, Ramesh and Priya, 2018)],the in-vivo studies include [(Teja and Ramesh, 2019),(Noor and Others, 2016),(Rajendran *et al.*, 2019b)], molecular study includes [(Hussainy, Nasim and Thomas, 2018)]. The reviews and systematic reviews published are [(Ravinthar and Others, 2018),(Manohar and Sharma, 2018),(Varma, Rambabu and Lakshmi, 2017)]. The surveys conducted were [(Ramanathan and Solete, 2015),(Janani, Palanivelu and Sandhya, 2020)]. The clinical trials about the root canal were [(Ramamoorthi, Nivedhitha and Divyanand, 2015),(R, Rajakeerthi and Ms, 2019),(Kumar and Delphine Priscilla Antony, 2018)]. Currently, we are analyzing retrospective studies and in this study, we have evaluated the root canal treatment done in mandibular first molars.

This study is of shorter duration with a limited population. So to ascertain the findings of our study, we have to do further studies in the future with a larger sample size and longer duration. This can be helpful to find more information regarding the frequency of root canal treatment done in mandibular first molars and its efficacy based on age and gender.Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Mathew *et al.*, 2020)

Table 1: Association between gender and root canal treatment in mandibular first molar. Male patients underwent more root canal treatment when compared to female patients. However, Pearson's Chi-square value =0.281, (p>0.05), implying no statistical significant difference.

		Mandibular Tooth		Total	Chi Square Value	P Value
		Mandibular Left First Molar (36)	Mandibular Right First Molar (46)			
Gender	Male	168	187	355		
	Female	109	145	254	1.162	.281
Total		277	332	609		

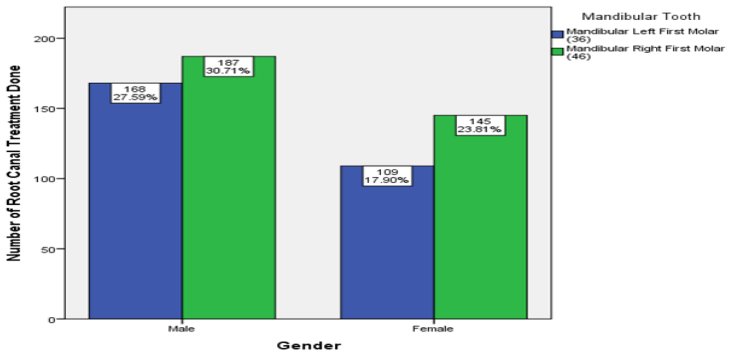

Fig.1: Graph showing distribution of gender and root canal treatment in mandibular first molar. X axis denotes gender and Y axis denotes the number of root canal treatment done. Male patients had more root canal treatment in mandibular first molar (Blue) and mandibular left first molar (Green) compared to female patients. However, Pearson's Chi-square value =0.281, (p>0.05), implying no statistical significant difference.

Table 2: Association between age and root canal treatment in mandibular first molar. In the age group of 18-30 years had more root canal treatment than other age groups. However, Pearson's chi-square p value =0.426 (p>0.05), implying no significant difference.

		Mandibular Tooth		Total	Chi Square Value	P Value
		Mandibular Left First Molar (36)	Mandibular Right First Molar (46)			
Age	18-30 yrs	139	168	307		
	31-40 yrs	59	80	139	2.783	.426
	41-50 yrs	52	47	99		
	>50 yrs	27	37	64		
Total		277	332	609		

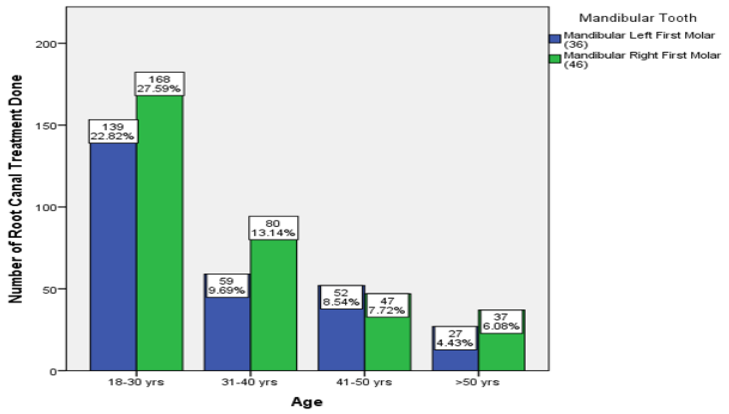

Fig.2: Graph showing distribution of age and root canal treatment in mandibular first molar. X axis denotes the age group and Y axis denotes the number of root canal treatment done. In the age group of 18-30 years, patients had more root canal treatment in mandibular first molar (Blue) and mandibular left first molar (Green) compared to other age groups. However, Pearson's chi-square p value =0.426 (p>0.05), implying no significant difference.

CONCLUSION

Within the limitations of the study, the age group of 18 to 30 years underwent most endodontic treatment in mandibular first molars especially the right mandibular first molars, The male patients had undergone more endodontic treatment in mandibular first molars. The mandibular first molars are the first to erupt in the oral cavity and are primary load-bearing teeth during clenching and mastication and in this study, most endodontic treatments were done in patients of younger age group reveals the poor maintenance and poor knowledge of people about the maintenance of the same. Thus it is important to create more awareness about the maintenance of oral hygiene.

Author contributions
All the authors contributed equally to the research

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Conflict of interest
Nil

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