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Association of Age, Gender and Teeth Distribution in Patients Undergoing Root Canal Treatment in Mandibular Premolars

Running Title: Age, gender and teeth distribution in patients undergoing root canal treatment in mandibular premolars

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Abstract:
Aim of the study is to find the association of age, gender and teeth distribution in patients undergoing root canal treatment in mandibular premolars.This study was conducted at a private dental institute between June 2019 to March 2020. 86000 patient records were analyzed. A total of 600 patients who underwent root canal treatment in 789 mandibular premolars were evaluated. Data collection was done and the results were tabulated in excel sheet. Obtained results were statistically analysed with SPSS software. From the results it was observed that, Maximum number of root canal treatment in mandibular premolars was done in the age group of 30 to 60 yrs (59.17%) with female predilection (56.50%)and the most common teeth undergoing root canal treatment among mandibular premolars was 45(33.97%). Association between age of the patient and number of patients undergoing root canal treatment in mandibular premolars was significant which revealed that most of the root canal treatment was done in the age group of 30 - 60 years and the teeth commonly involved was 35, Chi square test shows $p<0.05$,

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significant. Association between gender of the patient and number of patients undergoing root canal treatment in mandibular premolars revealed that most of the root canal treatment was done in female patients pertaining to tooth number 45 (20.03%) , however it was statistically not significant.

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Keywords: Age; gender; mandibular premolars; Root canal treatment

Introduction :

Dental caries is the most common cause for the loss of tooth in a clinical situation. Dental caries are easily detectable and reversible at an early stage.(De Deus, 1992; Rajendran *et al.*, 2019) Once the incipient lesion proceeds to cavitation, the condition becomes irreversible . Root canal treatment is done to repair or save the tooth which is damaged or infected by cleaning and disinfecting the root canal system. The main objectives of the root canal system is to eliminate infection from the root canal system and prevention of reinfection from the root canal system.(De Deus, 1992)(De Deus, 1992; Rajendran *et al.*, 2019)(De Deus, 1992) The reasons for undergoing root canal treatment in mandibular premolars involves dental caries leading to pulpitis, non vital tooth due to trauma or pulpal necrosis, non carious lesions, intentional root canal treatment in cases where there is no space for opposing tooth to be replaced.

Knowledge about the variations of root canal system of all teeth directly affects the outcome of endodontic treatment.(Chugal and Lin, 2016; Kumar and Delphine Priscilla Antony, 2018) Reasons that leads to endodontic treatment failure involves improper diagnosis,persistence of the infection, cleaning and shaping of root canal systems, instrument fracture and poor restorations.(Chugal and Lin, 2016; Arya *et al.*, 2018; Kumar and Delphine Priscilla Antony, 2018) Missed root canals are one of the main reasons of root canal treatment failure of mandibular premolars.

First important step in root canal preparation is adequate access activity preparation (Baskran and Pradeep, 2016). Access cavity preparation is done to extirpate the diseased pulp with standard instruments like K - files, H- files.(Levine, 1988) Removal of the microbial organisms from the root canal system is a prerequisite for successful outcome of any root canal treatment. Use of an effective intracanal medicament will assist in the disinfection of the root canal system.(Levine, 1988; Manohar and Sharma, 2018) Once the pulp is removed, various chemicals are used as irrigants for cleaning and shaping the root canals. This process is known as biomechanical preparation.(Seltzer, 1978) The major hurdle in root canal disinfection is the removal of the bacterial biofilm. One important step in root canal treatment is to find, clean and disinfect all root canals.(Nasim and Nandakumar, 2018; Saberi,Bijari and Farahi, 2018) Locating the canal and negotiating it to full working length may lead to iatrogenic errors such as fractured instrument and perforation.(Kumar and Delphine Priscilla Antony, 2018)The only way to achieve optimal removal is by following a proper irrigation protocol and final irrigant activation.(Teja and Ramesh, 2019) Chlorhexidine is an antibacterial used as an antiseptic, root canal irritant and for other applications. It is a cationic polybiguanide(Noor, S Syed Shihaab and Pradeep, 2016) Then canals are sealed with gutta percha of various sizes and coronal seal is done using permanent restoration.

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Various clinical trials (Ramamoorthi, Nivedhitha and Divyanand, 2015),(Ramanathan and Solete, 2015), surveys (Nasim and Nandakumar, 2018),(Hussainy*et al.*, 2018; Ramesh, Teja and Priya, 2018), (Ramesh, Teja and Priya, 2018), in vitro studies ((Ravinthar and Jayalakshmi, 2018)), (R, Rajakeerthi and Ms, 2019; Siddique *et al.*, 2019), (Siddique *et al.*, 2019), (Janani, Palanivelu and Sandhya, 2020), (Jose, P. and Subbaiyan, 2020) have been conducted in the field of conservative dentistry.Now we are focusing more on retrospective studies.Aim of the study is to find the association of age, gender and teeth distribution in patients undergoing root canal treatment in mandibular premolars

Materials and methods:

Study design and setting:

The study setting is university based single centered study. A retrospective study was conducted on 600 patients who visited a private dental college with complaint of pulpitis requiring root canal treatment in mandibular premolars. Thus the population includes patients who underwent root canal treatment for 789 mandibular premolar teeth. The advantage of this study was the flexible data that could be obtained immediately and less expensively. The drawback of this study is that there were geographic limitations and the people involved were from an isolated population. The internal validity of the study was carried out by analysing the age and gender of patients who had undergone root canal treatment in mandibular premolars.

Data collection

The inclusion criteria was patients requiring root canal treatment in mandibular premolars. The patient records were reviewed and analysed between June 2019 and March 2020 and the details of patients who had undergone root canal treatment in mandibular premolars was noted. All available data was included to minimise sampling bias. Cross verification of details were done with the help of photographs and radiographs. Patients of all age groups were included in this study. The data of age and gender of patients who underwent root canal treatment in mandibular premolars was tabulated. Incomplete and censored data was excluded. Data was entered in a methodical manner. Data was recorded and tabulated on Excel.

Statistical Analysis

After Excel tabulation, the data was exported to IBM SPSS software [Version 20: IBM Corporation NY USA]. Descriptive statistics were used to calculate correlation between age and gender of patients who underwent root canal treatment in mandibular premolars. The dependent variable was the treatment done which is root canal treatment in mandibular premolars. The independent variables were age and gender. Pearson chi square test was done to statistically analyze the data. Pearson chi square test was used to identify any significant level of variation of association the significance level was set at 0.05

Ethical Approval

The ethical approval for the retrospective study was obtained from the university (SDC/SIHEC/2020/DIASDATA/0619-0320).

Results and Discussion:

The study included 600 patients and 789 root canal treatments in mandibular premolars. Maximum number of mandibular premolar root canal treatment was done in the age group of 30 -60 yrs (59.17%) and the least being patients above 60yrs (12.33%) (Figure 1).

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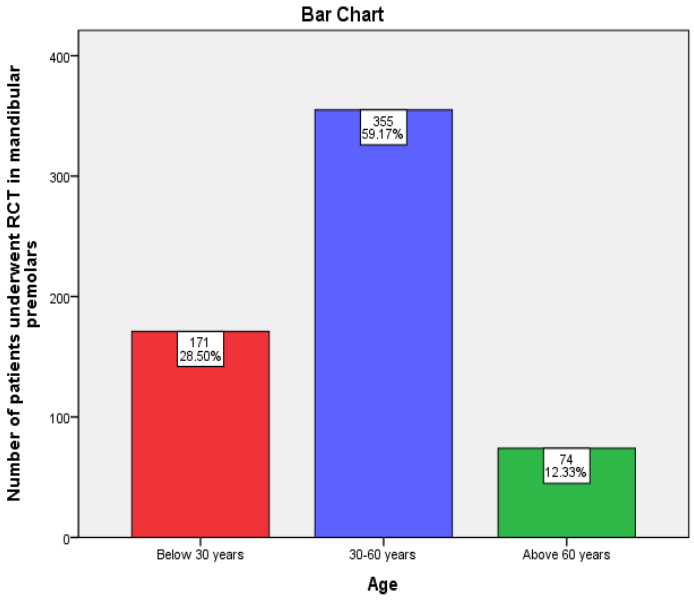

Figure 1:Bar graph represents the distribution of patients undergoing root canal treatment in mandibular premolars based on age group. X axis represents the age of patients and Y axis represents the number of patients who underwent RCT in mandibular premolars. Maximum number of mandibular premolar root canal treatment was done in the age group of 30 -60 yrs (59.17%) (blue) and the least being patients above 60yrs (12.33%) (green).

Female patients (56.50%) and male patients (43.50%) had undergone root canal treatment for mandibular premolars(Figure 2).

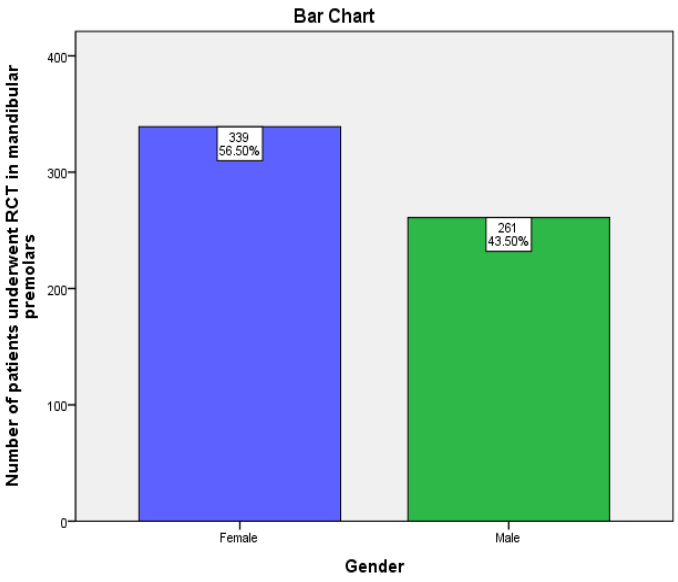

Figure 2 :Bar graph represents the gender distribution of patients undergoing root canal treatment in mandibular premolars. X axis represents the gender of patients and Y axis represents the number of patients who underwent RCT in mandibular premolars. Female patients (56.50%) (blue) and male patients (43.50%) (green) had undergone root canal treatment for mandibular premolars.

Maximum number of mandibular premolar root canal treatment was done in 45 (33.97%) and the least being done in 34 (14.20%)(Figure 3).

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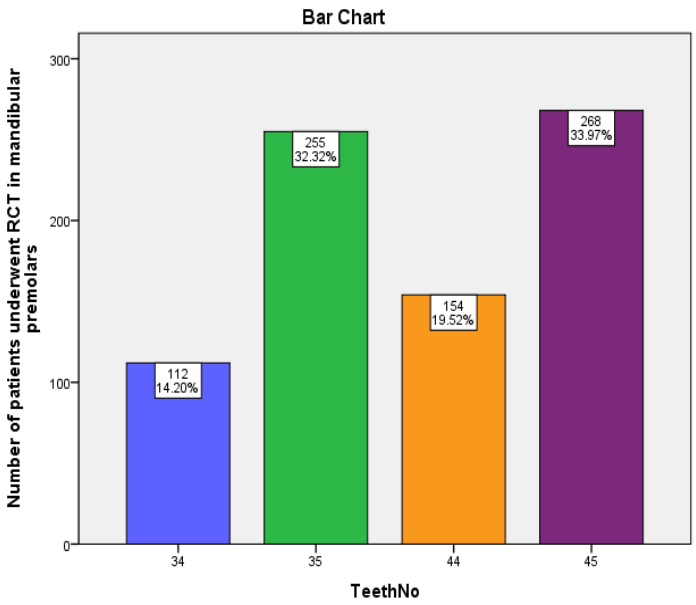

Figure 3 :Bar graph represents the teeth distribution of patients undergoing root canal treatment in mandibular premolars. X axis represents the teeth distribution and Y axis represents the number of patients who underwent RCT in mandibular premolars. Maximum number of mandibular premolar root canal treatment was done in 45 (33.97%) (purple)and the least being done in 34 (14.20%) (blue).

Association between age of the patient and number of patients undergoing root canal treatment in mandibular premolars,revealed that most of the root canal treatment was done in the age group of 30 - 60 years,teeth commonly involved was 35(18.34%) and the least was patient above 60 years in 34 (2.28%), hence statistically significant (p<0.05) (Figure 4).

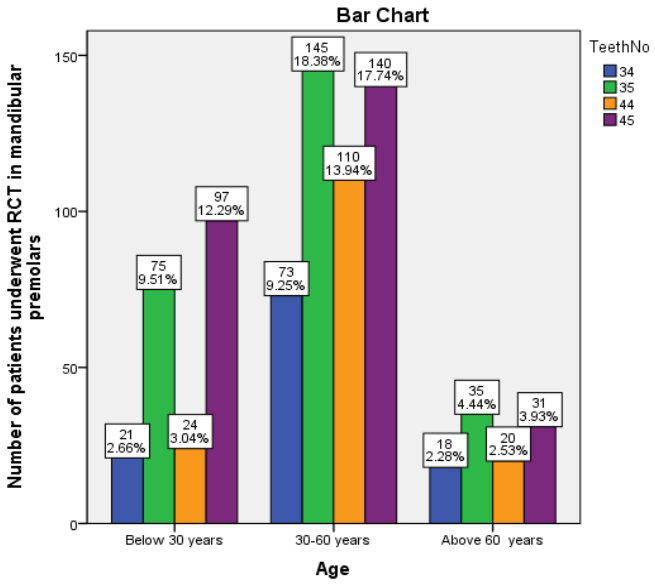

Figure 4 :Bar chart showing the association between age of the patient and number of patients undergoing root canal treatment in mandibular premolars. X axis represents age of the patient and Y axis represents number of patients who underwent RCT in mandibular premolars. Most of the root canal treatment was done in the age group of 30 - 60 years,teeth commonly involved was 35(18.34%) (green) and the least was patients above 60 years in 34 (2.28%)(blue). Pearson's Chi-square value = 51.456, df = 6, p value 0.00 (<0.05) , significant. Hence proving that there is a statistically significant association between age of the patient and number of patients undergoing root canal treatment in mandibular premolars.

Association between gender of the patient and number of patients undergoing root canal treatment in mandibular premolars revealed that most of the root canal treatment was done in female patients pertaining to tooth number 45 (20.03%) (purple) and the least being 34 in male patients (5.70%), hence statistically not significant (p >0.05)(Figure 5).

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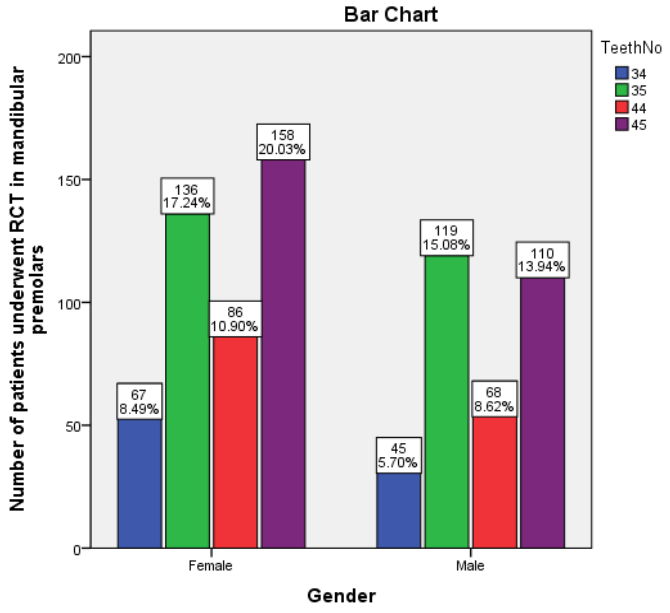

Figure 5: Bar chart showing the association between gender of the patient and number of patients undergoing root canal treatment in mandibular premolars.X axis represents the gender of the patient and Y axis represents number of patients who underwent RCT in mandibular premolars. Most of the root canal treatment was done in female patients pertaining to tooth number 45 (20.03%) (purple) and the least being 34 in male patients (5.70%) (blue). Pearson's Chi-square value = 2.222 df = 3, p value 0.528 ($p > 0.05$) significant. Hence proving that there is a statistically significant association between gender of the patient and number of patients undergoing root canal treatment in mandibular premolars.

Our study assessed the association of age, gender and tooth number of mandibular premolars. The study group was divided into age groups of below 30 years, 30-60 years and above 60 years. Age group between 30-60 years had the highest incidence of root canal treatment in mandibular premolars while the age group above 60 years had the least incidence for root canal treatment in mandibular premolars. More females had reported for root canal treatment in mandibular premolars than males, this is because females were more concerned about their oral health than males. Similar to our study, Augusto et al. reported that the majority of the females had undergone root canal treatment (Hollanda*et al.*, 2008). But Osama et al reported that there was higher incidence in males more than females in his study. (Osama *et al.*, 2009)AU Umana et al reported that half of the patients encountered in the study were females and also most of the patients were found to be young aged adults in the study.((Hollanda*et al.*, 2008; Umanah, Osagbemiro and Arigbede, 2012).

The analysis of prevalence of root canal treatment according to age revealed a higher prevalence in the 46 to 60 year-old range and a decrease in subjects older than 60 years (Hollanda*et al.*, 2008). In contrast to our study umana et al. said that most of the patients that presented were found in the 20-29 years age group. high frequency of anterior, premolar and molar RCTs among the 20-29years age group was observed.It was also seen that root canal treatments were more frequently undertaken in maxillary teeth than mandibular teeth (Umanah, Osagbemiro and Arigbede, 2012).

Baidaa et al. States the maxillary teeth showed higher percentage (55.986%) of root canal treatment than mandibular teeth (44.013%), while mandibular molars show higher percentage(23.102%) in the treated cases than other teeth groups (. Dr. Baidaa Mohammed Zeidan B. D. S., Mohammed KassimGholam B. D. S. and Firas Saddam Oglah B. D. S., 2011). Karin et al. also has studied that the molars were the teeth most frequently treated (46.5%), followed by the anteriors (39.5%), and the premolars (14.0%). The mandibular posteriors due to their location are not susceptible to injury as compared to the rest of the teeth (Ridell, Sundin and Matsson, 2003).

According toOmitola et al. study reported that patients in their third and fourth decade have been

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more commonly observed for dental treatment. (Omitola, Osagbemiro and Akadiri, 2011)Farret et al reported that the highest incidence of endodontic treatment was performed among patients between 21-29 years age group.(Farrell and Burke, 1989)Scavo et al and Al-negrish et al reported that 55.7% and 77% of root canal treatment were performed in maxillary teeth respectively (Scavo*et al.*, 2011)(Al-Negrish, 2002; Scavo*et al.*, 2011)

Mandibular premolars have been reported with complex anatomical aberrations, making them one of the most difficult teeth to manage endodontically. Mandibular premolars typically present with a single root and a single canal (Kottoor and Albuquerque, 2013). The solitary root is usually oval in cross section containing an oval cross-section canal. Canal configurations in mandibular premolars may vary significantly with respect to ethnicity, race, and sex (Vertucci, 2005). Mandibular first premolar is often considered as an enigma to endodontists. Though the most frequent type of tooth configuration reported is the presence of one root and root canal. (Singh *et al.*, 2018) The occurrence of additional roots or canals in mandibular premolars is certainly an endodontic challenge (Messer, 1999)

Another reason that could have accounted for the reduced root canal treatments being performed is that in our environment some of the patients who needed RCT in posterior teeth often declined on financial ground. An extraction is generally preferred by the patient. The advantages of the study was availability of data and history of the patients. The limitations of the study was the data available was not location specific and belonged to different ethnicity.

Conclusion:

Within the limitations of study,it was found that maximum number of mandibular premolar root canal treatment was done in the age group of 30 -60 yrs (59.17%), with female predominance (56.50%) and teeth number 45 (33.97%) .Association between age of the patient and number of patients undergoing root canal treatment in mandibular premolars was significant which revealed that most of the root canal treatment was done in the age group of 30 - 60 years and the teeth commonly involved was 35.Association between gender of the patient and number of patients undergoing root canal treatment in mandibular premolars revealed that most of the root canal treatment was done in female patients pertaining to tooth number 45 (20.03%) , however it was statistically not significant.

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