
Prevalence Of Three Rooted Primary Mandibular Molars In Children Visiting A University Hospital In Chennai - A Retrospective Study

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Abstract: Awareness and knowledge of the presence of accessory roots and variation in the root canal morphology in primary mandibular molars are essential to determine the positive outcome of the treatment. In this study, we aimed to evaluate the presence of three rooted primary mandibular molars in children of Chennai population. This study was designed as a retrospective study, conducted among patients who reported to the University dental hospital. Subjects aged 2 to 10 years of Chennai population, subjects who underwent endodontic procedures with complete data were included in this study. Subjects of other regions were excluded from this study. Data was collected and tabulated in excel. Data was analysed using IBM SPSS Statistical Analyzer (23.0 version). Frequency distribution and descriptive analysis were carried out. The association between the variables was analysed and assessed using Pearson Chi-square test. p value < 0.05 was considered to be statistically significant. The total occurrence of three rooted primary mandibular molars among the study subjects was found to be 0.8% among different age as well as gender. Prevalence of three rooted primary mandibular molars was found to be higher in males compared to females among the study population.

Keywords: Three rooted primary mandibular molars, Anomalies, Variation in root canal, Children.

INTRODUCTION

Knowledge of tooth and root canal anatomy is important for dental practice and for identifying features of anthropological significance. (Ounsi et al., 2009; Govindaraju, Jeevanandan and E. M. G. Subramanian, 2017a) Primary mandibular molars usually have two roots and three root canals with the formation of accessory roots being uncommon. (Cleghorn, Boorberg and Christie, 2010; Somasundaram et al., 2015; Govindaraju, Jeevanandan and E. M. G. Subramanian, 2017b) The prevalence of dental anomalies is lower in the primary dentition than in the permanent dentition. Anatomical variations are found to be a characteristic feature of mandibular permanent molars. Mandibular first molars most commonly have two roots placed mesiodistally, but they sometimes have an additional distolingual root. This additional root present on the distolingual aspect is called as radix entomolaris. This extra root is typically smaller than the distobuccal root and is usually curved. Thus requires more attention when endodontic procedures are being considered for such a tooth. Similarly, additional mesiobuccal root is called as radix paramolaris. (Kapdan et al., 2012; Veerale Panchal, Jeevanandan and Subramanian, 2019)

Factors such as external environmental influence during odontogenesis, racial and genetic influences are considered to be the causes for additional roots in primary as well as permanent dentition. The reports on prevalence of three rooted primary mandibular molars vary in different populations. Many literatures showed evidence of high degree occurrence of three rooted mandibular molars in Native Americans, Caucasian and Eskimo populations. The occurrence of an extra distal root in these molars is also considered a racial characteristic of certain native Indian and mongoloid populations (Tu et al., 2007; Govindaraju, Jeevanandan and E. Subramanian, 2017). Tratman found that three rooted mandibular first molars are rare (Frequency $< 1\%$) in the primary dentition and common in the permanent dentition. (TRATMAN and EK, 1938; Ravikumar, Jeevanandan and Subramanian, 2017) The morphology of deciduous teeth in comparison with their permanent counterparts, is thinner enamel and dentin and larger pulp chamber with accentuated pulp horns. (Ramamurthy and Srinivasan, 2012; Linda Christabel and Gurunathan,

2015)Hence, deciduous teeth often present post carious pulpal implications that require appropriate intervention.(Srivathsa, 2015; Gurunathan and Shanmugaavel, 2016)Rather than premature extraction, a more conservative treatment approach, the retention of primary teeth through restorative or endodontic means has been evolved amongst dental practitioners and pediatric specialists.(Brabant, 1967; Govindaraju and Gurunathan, 2017; Packiri, Gurunathan and Selvarasu, 2017) In paediatric dentistry the most important concerns is the loss of necrotic primary molars leading to space loss.(Jeevanandan and Govindaraju, 2018)The principal goal of this is to retain the primary teeth in the oral cavity until its physiological exfoliation to preserve arch integrity .(Jeevanandan, 2017; Ramakrishnan and Shukri, 2018) Pulpectomy is considered to be the treatment of choice for primary teeth with pulp involvement. (Nair et al., 2018; Subramanyam et al., 2018)The main objective of pulp therapy in the primary dentition is to retain every primary tooth as a fully functional component in the dental arch.Pulp therapy should result in the thorough mechanical as well as chemical debridement of the entire pulp cavity, followed by complete obturation with a hermetic seal. As a result,additional roots pose a great endodontic challenge, as incomplete pulp extirpation due to missed canal can result in treatment failure.Clinicians should be familiar with multiple root anatomy to avoid missing canals.(Fumes et al., 2014)

To achieve this goal, proper knowledge of the normal and abnormal morphology of primary teeth roots and root canal systems is required in making diagnosis and treatment decisions in young patients.(Nagaveni et al., 2017) 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; Rajendran et al., 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma et al., 2019; Varghese, Ramesh and Veeraiyan, 2019; V. Panchal, Jeevanandan and Subramanian, 2019; Gomathi et al., 2020; Samuel, Acharya and Rao, 2020)

The aim of this study was to evaluate the prevalence of three rooted primary mandibular molars in children of Chennai population.

MATERIALS AND METHODS

This is a retrospective clinical study that is performed to evaluate the prevalence of three rooted primary mandibular molars in University dental hospital.After obtaining the ethical clearance from the Institutional Ethical Committee (Ethical approval number : SDC/SIHEC/2020/DIASDATA/0619-0320)the list of all subjects treated with endodontic procedures were retrieved by reviewing the patient's record who have visited the hospital during the study period from June 2019 to March 2020 based on the following criteria.

Inclusion criteria:

- Subjects aged 2 to 10 years old of Chennai population
- Subjects who underwent endodontic procedures which include both single visit pulpectomy and multi visit pulpectomy between June 2019 to March 2020
- Patient records with complete data, photographs and both preoperative and postoperative radiographs

Exclusion criteria:

- Subjects belonging to other regions
- Patient records with incomplete data of clinical examination and distorted or blurred radiographs

After reviewing the records of 86000 patients, a total of 1101 records which satisfied the inclusion and exclusion criteria were included in the study.From the preoperative and postoperative records of the study population, data such as age, gender, tooth number with three roots, postoperative findings and observations were obtained.The data was analysed by IBM SPSS Statistical Analyzer(23.0 version).Frequency distribution of categorical variables and descriptive analysis for quantitative variables were carried out.The association between the variables was analysed and assessed using Pearson Chi-square test.p value less than 0.05 was considered to be statistically significant.

RESULTS AND DISCUSSION

This study included 1101 participants.Gender distribution of the study population was 42.8% female participants and 57.1% male participants (Figure-1).Majority of the study population that is 26.16% of patients were 5 years old followed by 23.16% of 4 years old, 18.35% of 6 years old, 11.44% of 3 years old, 9.08% of 7 years old, 4.90% of 8 years old, 3.54% of 9 years old , 2.18% of 2 years old and remaining 1.18% of patients were 10 years old(Figure-2). The total occurrence of three rooted primary mandibular molars among the study subjects was 0.8%(9/1101)(Figure-3).Higher number of three rooted primary mandibular molars were found in males, 77.78%(7/9) compared to females, 22.22%(2/9)(Figure-4).Three rooted primary mandibular molars occurred on either right side or left side

with no bilateral occurrence noted. Tooth wise distribution of three rooted primary mandibular molars was found to be #74-55.5%(5/9), #75-0, #84 and #85 -22.2%(2/9 each) among different age groups as well as gender(Figure-5). There is no association between gender and prevalence of three rooted primary mandibular molars among the study population(Figure-6).

The rarity of the reports of anomalous root patterns in primary teeth may not reflect the real situation. This is because there is only a limited time between formation and resorption. When radiography can reveal their presence. In many cases, when primary teeth are extracted, root resorption has already removed the evidence. (Falk and Bowers, 1983) Accessory roots form in a similar fashion to normal roots, that is, as a result of the in growth of processes from the root sheath of Hertwig. (Gupta, Nagaveni and Chandranee, 2012) Three rooted mandibular molars result either from a bifurcated distal root or an accessory distolingual root. (Somogil-cstzmazia, 1971)

Tu et al. reported that 5% of Taiwanese subjects had three rooted mandibular primary first molars and that 80% of such teeth occurred unilaterally. (Tu et al., 2009) Liu et al described the prevalence of three rooted anomalies in the primary lower second molars in Chinese patients. (Tu et al., 2010) Song JS et al in a radiographic study revealed that 5.6% of 1408 samples of mandibular first primary molars had an additional distolingual root. (Song et al., 2010) In the present study, the prevalence of three rooted primary mandibular molars differ with sex with male predominance, which is consistent with findings for three rooted primary mandibular molars in Koreans, in which there was a significant male predominance. (Song et al., 2009) The prevalence (0.8%) of three rooted primary mandibular molars in this study was lower than that in similar studies. By using extracted teeth, Walker and Quackenbush found a prevalence of 14.6% in Hong Kong Chinese. (Walker and Quackenbush, 1985) Winkler and Ahmad reported multi root anomalies in the primary mandibular first molars and both first and second molars of Native Americans. (Winkler and Ahmad, 1997)

An additional root has endodontic, exodontic and periodontal implications in clinical dentistry. Anomalous root patterns may pose the great endodontic challenge, as incomplete pulp extirpation due to missed canal can result in treatment failure. (Nagaveni et al., 2014) The same caution should be followed in the treatment of primary mandibular molars. Dentists should be familiar with multiple root anatomies to avoid missing canals. During extraction of primary molars with three roots, the clinician should make sure that the Crown of the premolar is not trapped in the Inter radicular area of the primary molar, as this could cause accidental removal of the developing tooth bud. (Nagaveni and Umashankara, 2012) Primary mandibular molars can display several anatomical variations such as the presence of accessory roots most commonly located distolingually. To avoid complications during procedures, radiographic examination to be done prior to endodontic or exodontic procedures to help in identifying the tooth morphology and its anatomical variations for positive outcome of treatment. The results of the study are in accordance with the suggestion that three rooted mandibular molars are rarer in primary dentition than permanent dentition. 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)

LIMITATIONS

The limitations of this study include small study population, results cannot be generalized to larger populations and since it is a retrospective study, patients were not examined directly leading to subjective bias.

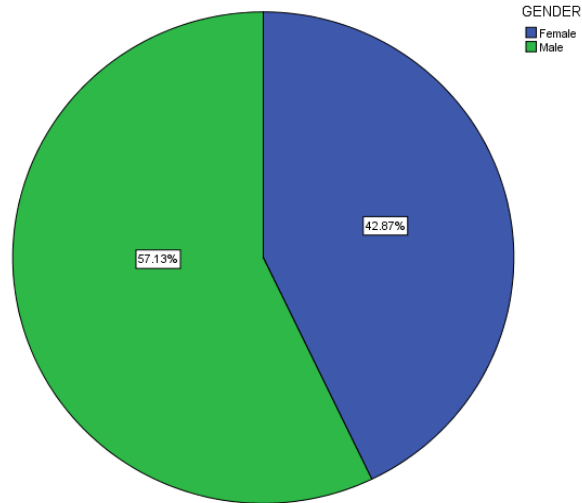


Fig.1: Pie chart showing the gender distribution of the study population. Among the study population, 42.8% were females (blue) and 57.1% were males (green).

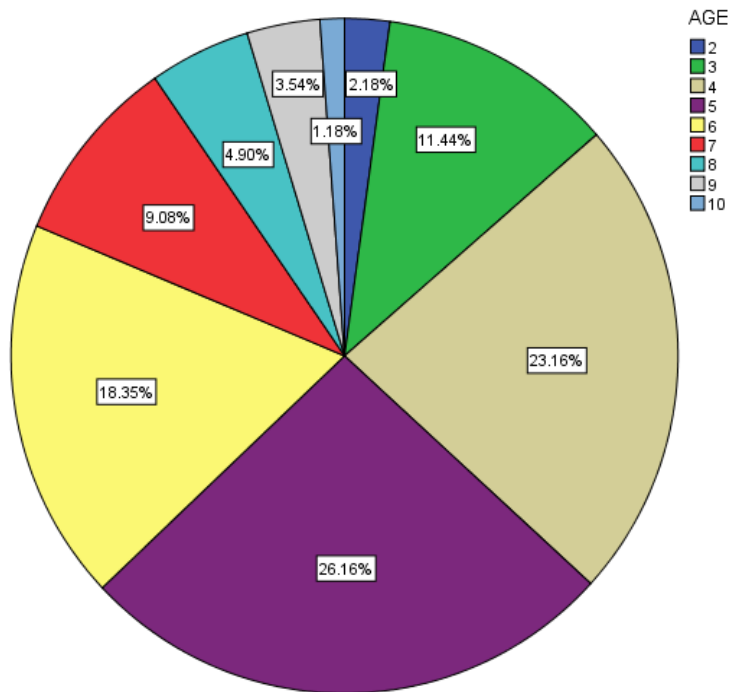


Fig.2: Pie chart showing age distribution of the study population. Majority of the study population, 26.16% of patients were 5 years old (purple) followed by 23.16% of 4 years old (beige), 18.35% of 6 years old (yellow), 11.44% of 3 years old (green), 9.08% of 7 years old (red), 4.90% of 8 years old (turquoise blue), 3.54% of 9 years old (grey), 2.18% of 2 years old (dark blue) and 1.18% of 10 years old patients (blue).

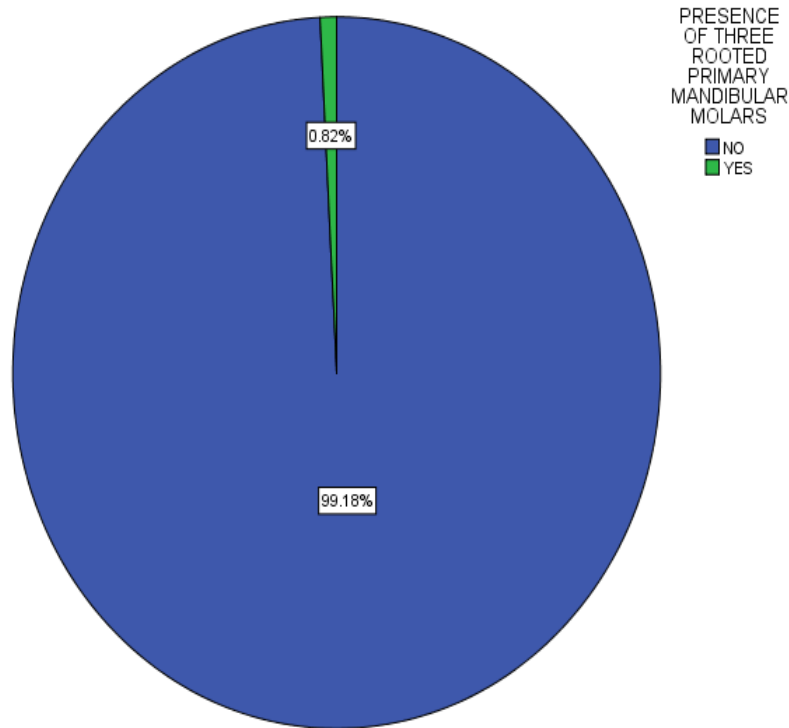


Fig.3: Pie chart showing prevalence of three rooted primary mandibular molars.Only 0.8% of patients (green) were found to have three rooted primary mandibular molars among the study population

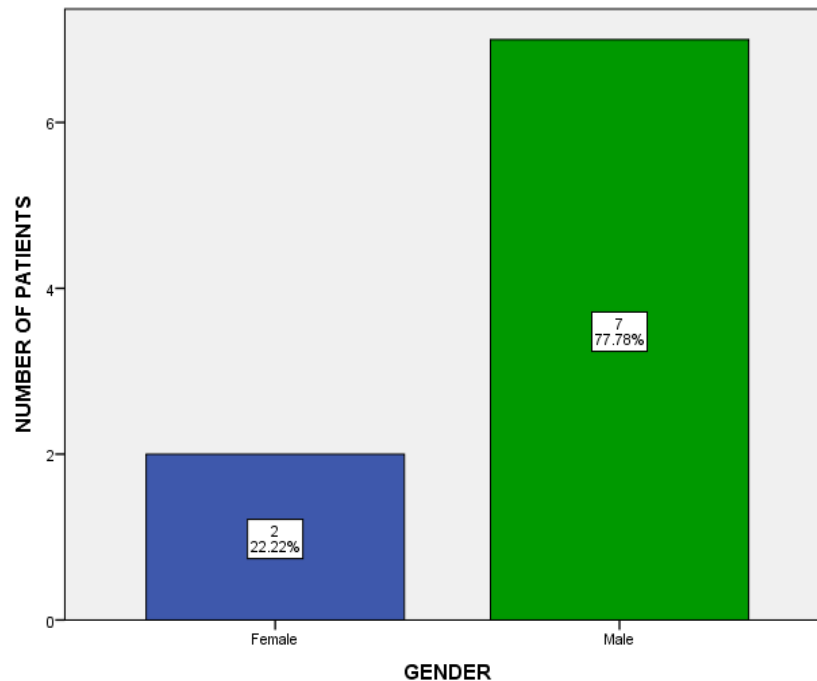


Fig.4: This bar graph represents the gender distribution of study population with three rooted primary mandibular molars.X-axis represents the gender and Y-axis represents the number of patients.Among the children who presented with three rooted mandibular primary molars 7 patients (77.78%) were males (green) and 2 (22.22%) were females (blue) with three rooted primary mandibular molars.

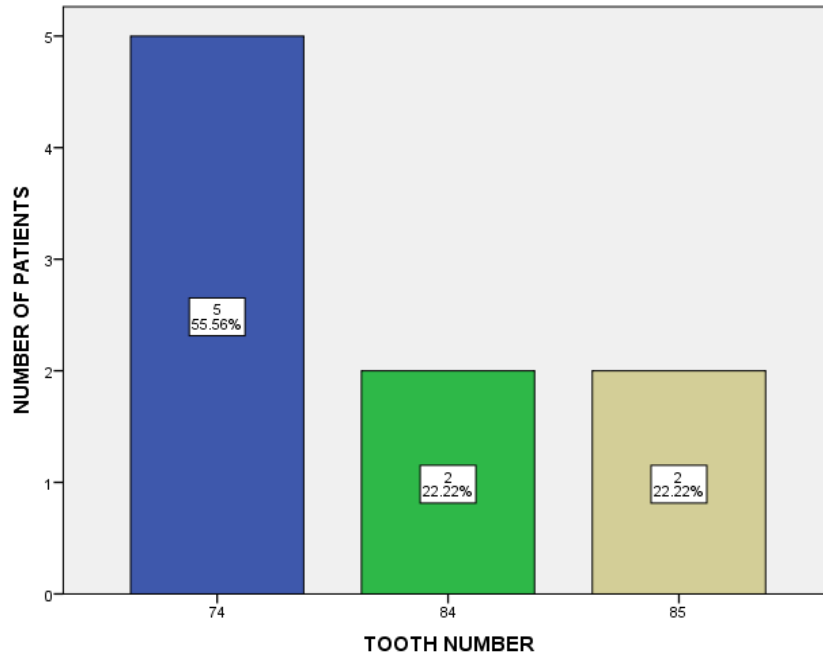


Fig.5:This bar graph represents the toothwise distribution of three rooted primary mandibular teeth.X-axis represents the tooth number and Y axis represents the number of patients.74(blue) was found to be the most frequent tooth with three roots i.e;5(55.56%) followed by equal distribution of 84(green) and 85(beige) i.e; 2(22.22%) each.

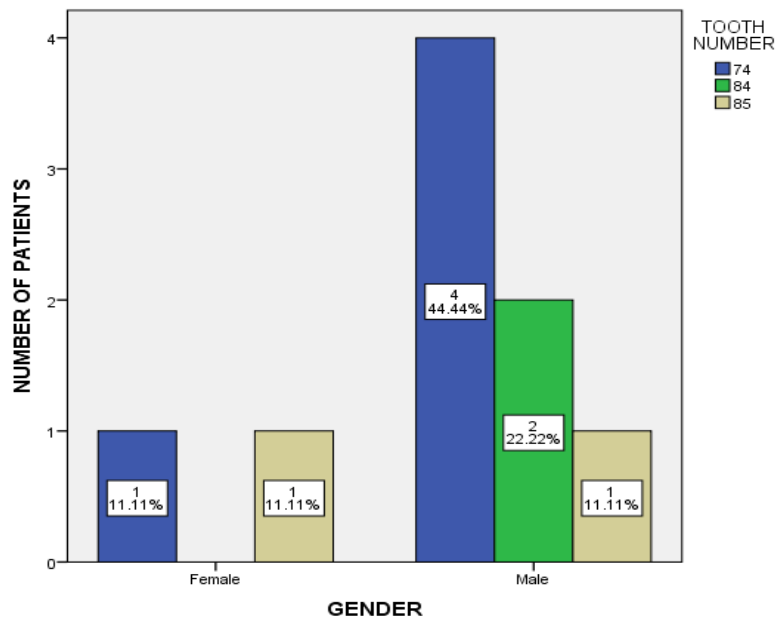


Fig.6:This bar graph represents the association between gender and prevalence of three rooted primary mandibular molars. X-axis represents the gender and Y-axis represents the number of patients.Higher number of three rooted primary mandibular molars were found in males compared to females. Chi square test was done, p value = 0.477>0.05 hence the association was not statistically significant proving that gender does not influence the prevalence of three rooted primary mandibular molars.

CONCLUSION

The results of the current study showed a total prevalence of 0.8% of three rooted primary mandibular molars with higher male predilection though it was not statistically significant. Mandibular left first primary molar was found to

be the most frequent tooth with three roots. Clinicians should have sound knowledge regarding the variations in the root morphology for the successful outcome of the treatment.

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