

Prevalence of Root Canal Treatment in First Molars among Children in Chennai - An Institutional Retrospective Study

Research Article

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Abstract

Dental caries is the most prevalent and common chronic infectious disease of childhood. First permanent molars considered as the teeth most prone to dental caries. Prevention and treatment of dental caries in first permanent molars among children essential and is a major concern in today's lifestyle. The aim of this study is to assess the prevalence of Root Canal Treatment in first molars among children in Chennai city. This was a retrospective, institutional based study. Sample size was 298. Data about patients below 18 years who underwent root canal treatment in the first molar in a period of June 2019 to March 2020 were collected. Excel tabulation was done and data was transferred to SPSS software. T test and Pearson correlation was done to compare the tooth number and presence of lesion, tooth number and number of visits. $p < 0.05$ was considered statistically significant. The mean age of males was 13.17 and females was 12.95, the mean age for RCT done in a molar with lesion was 13.43 and without lesion was 12.81 and the mean age for RCTs done in single visit was 13.44 and multi visit was 13.02. Statistical difference was seen between age and presence of lesion ($p = 0.047$), and between tooth number and root canal treatment done in a molar with or without lesion ($p = 0.001$). From the present study we can conclude that root-canal treatment below the age group of 18 in permanent first molar was performed most commonly in the lower right molar (#46) and it was mostly associated with the presence of periapical lesions lesions.

Keywords: Lesion; Permanent First Molars; Root canal Treatment.

Introduction

Dental caries is one of the most important dental diseases seen in children and adults. Although efforts are made for prevention, dental caries have been most common among children. Frequency of caries varies depending on the tooth, its morphology, eruption stage, tooth position causing deposition of plaque [1]. First permanent molars are mostly susceptible to caries in school children [2]. First permanent molar is important for development of normal occlusion [3]. It plays an important role in delimiting the space where the remaining permanent molars erupt and their premature loss may disrupt the eruption causing migration of the teeth. First permanent molars are the biggest teeth and have the strongest anchorage and play a vital role in mastication due to its position. They also influence the vertical distance of jaws,

occlusal height and aesthetic proportions. They also have the ability to control the teeth erupting anterior and posterior to it. First permanent molar is the earliest to erupt hence it is more prone to decaying than the rest of the teeth [4]. For younger people the first permanent molar has an extremely higher caries rate [3]. Reasons for increased decay rate in first molars are deep pits and fissures, lack of knowledge about oral hygiene among parents [5].

The availability of endodontically treated teeth and teeth required for endodontic therapy due to deep caries should be addressed as it is most common in developing countries. Prevention and treatment of dental caries in the first permanent molar are important to restore its function.

Diagnosis of dental caries implies not only finding the lesion but

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deciding whether it is active, progressing slowly or rapidly or arrested. Treatment is difficult without assessing the activity of caries. Traditional caries detection tools which have been followed for many years includes clinical and radiographic examination of the teeth. Management technique that arrests the caries process and allows remineralisation should be preferred that it helps to conserve the tooth structure and prevents surgical interventions. Caries risk assessment should be done to rule out the effective treatment. In general it includes, caries experience, diet frequency and contents, exposure to fluoride, plaque, saliva, bacteria and oral hygiene. Several caries risk assessment tools are present nowadays and the most followed one is a computer based program, cariogram.

Simple restoration is done for caries in first permanent molars. Pulp capping is done if there is a pinpoint exposure of pulp(6). When the decay reaches the pulp, the treatment of choice is root canal treatment [3]. Extraction is the last choice for treating permanent first molars. Tooth extractions are said to be done in older adults mainly due to advanced periodontal diseases while in younger adults and children it is mainly due to extensive incurable caries. Orthodontic treatment should be done to reposition the second molar and take the first molar's place so that normal occlusion may still occur [3]. Most of the time caries in first permanent molars are with the temporary molar [7]. The caries in the permanent first molars are neglected by the parents because they are mistaken as a temporary tooth and will fall eventually. Endodontically treated teeth and teeth requiring endodontic treatment due to dental caries is considered as a dental community problem [8]. Management of oral hygiene post endodontic treatment is must to preserve the remaining teeth.

Previously our team had conducted various clinical trials [9-12] *in vitro* studies [13][14] *in vivo* studies [15] and other studies [16-23]. Now we are focussed on retrospective studies.

The aim of this study was to evaluate the prevalence of root canal treatment done in permanent first molars of children under 18 years, and objectives were to report the most susceptible tooth, presence of lesions, number of visits for RCT among children who visited Saveetha Dental College during the period June 2019 to March 2020.

Materials and Methods

Study Design

This is a retrospective study conducted in a private dental institution. The patient case records were reviewed for the necessary information by a trained examiner. The advantage of conducting the study in an institutional set up provides easy access to patient records. Among patients who have visited the dental clinic of the institution, 298 records of first permanent molars of subjects under 18 years. The institutional ethical committee provided approval for the study (SDC/SIHEC/2020/DIASDATA/0619-0320).

Inclusion criteria

1. Patients who had RCT done 1 first permanent molar
2. Patients below 18 years

Exclusion criteria

1. Incomplete patient data
2. Duplicate patient data
3. Patient above 18 years

Sampling

A total of 298 teeth of patients who had undergone Root Canal Treatment from June 2019 to March 2020 were reviewed and the dental data regarding root canal treatment, presence of lesion, number of visits were retrieved. Convenient sampling method was used to select the patients for the study. The data obtained from the case records were cross verified with photographs.

Data collection

All the data after thorough checking for duplicates, incomplete entries and cross verification with photographs were entered in Microsoft excel spread sheet in order to organise the data. The variables obtained from the data included presence of lesion, number of visits, tooth number, age, gender. Here the age, gender, tooth number are the independent variables and the presence of lesion and number of visits are the dependent variable.

Statistics

The statistical analysis of the obtained data was performed by the SPSS software version 23.0. The data from the excel spreadsheet was transferred to SPSS software for analysis. Chi square tests were employed in order to find the association between different variables. The p value less than 5% was considered statistically significant. Descriptive statistics was conducted for all the variables and the mean was calculated. The final results are presented in the form of graphs for further interpretation and discussion.

Results and Discussion

Retrospective study was conducted using data available. Retrospective studies may be helpful in offering endodontic treatment models that can be treated later using prospective studies. Out of 298 first molars, 169 RCTs were done in boys and 129 in girls. The mean age of males was 13.17 and females was 12.95. 126 RCTs were done in tooth with lesion and 172 in tooth without lesion. The mean age for RCT done in a molar with lesion was 13.43 and without lesion was 12.81. 39 pts had undergone RCT in a single visit while 259 had undergone RCT in multiple visits. The mean age for RCTs done in a single visit was 13.44 and multi visit was 13.02. Statistical difference was seen between age and presence of lesion ($p=0.047$) (Table 1).

The association of tooth number and number of visits of RCTs were studied in that 36.58% of the multi visit RCTs were done in 46, 28.58% in 36, 9.06% in 26 and 12.75% in 16, while 6.04% of single visit RCTs were done in 46, 2.03% in 36, 1.01% in 26 and 2.01% in 16. The chi square test showed that there was no statistical significance between tooth number and number of visits for RCT. (pearson chi square value: 0.438; df:3; p value: 0.932) (figure 1).

The association of tooth number and presence of lesion were

studied in that 22.48% of the RCTs were done in 46 with lesion, 14.77% in 36, 8.72% in 26 and 11.74% in 16, while 20.13% were done in 46 without lesion, 17.79% in 36, 1.34% in 26 and 3.02% in 16. The chi square test showed that there was a statistical significance between tooth number and RCT done in a tooth with or without lesion. (pearson chi square value: 26.242; df:3; p value: 0.00) (Figure 2).

The association of tooth number and gender was studied in that, In 16, 8.39% of RCTs were done in males and 6.38% in females. In 26, 4.70% of RCTs were done in males and 5.37% in females.

In 36, 18.46% of RCTs were done in males and 14.09% in females. In 46, 25.17% of RCTs were done in males and 17.45% in females. The chi square test showed that there was no statistical significance between tooth number and gender. (pearson chi square value: 0.678; df:3; p value: 1.517) (Figure 3).

127(42.6%) of the RCTs were done in 46 and is the most prevalent compared to other permanent first molars.

It was found that RCT done most frequently on children was on the lower right back tooth region. Research done by demirboga et

Table 1. Shows the mean, Std. deviation and p value of gender, presence of lesion, number of visits for RCT. There was a significant difference between the age and presence of lesion (p<0.05).

| VARIABLES | N | MEAN AGE | STD. DEVIATION | P VALUE |
|--------------------|-----|----------|----------------|---------|
| MALE | 169 | 13.17 | 2.666 | 0.466 |
| FEMALE | 129 | 12.95 | 2.617 | |
| PRESENCE OF LESION | 126 | 13.43 | 2.487 | 0.047 |
| ABSENCE OF LESION | 172 | 12.81 | 2.73 | |
| SINGLE VISIT | 39 | 13.44 | 2.1 | 0.360 |
| MULTI VISIT | 259 | 13.02 | 2.714 | |

Figure 1. Depicts association between the tooth number with the number of visits for RCT in permanent first molars. X axis represents tooth number and Y axis represents percentage root canal treatment done in single or multiple visits. From the present graph it can be inferred that there is no association found between the tooth number and root canal treatment done in single or multiple visits (p value=0.932; chi square value=0.438); statistically not significant.

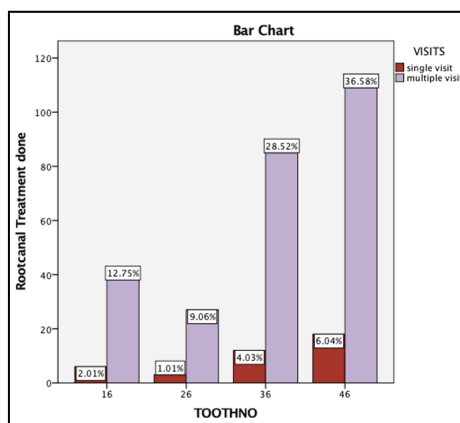


Figure 2. Depicts association between the tooth number with the presence of periapical lesion in teeth treated with RCT. X axis represents tooth number and Y axis represents percentage of root canal treatment done in molars with lesion (present or absent) . From the present graph it can be inferred that periapical lesions were higher in mandibular molars compared to maxillary molars in which RCT was done and there was an association found between the tooth number and presence of lesion (p value=0.001; chi square value= 26.242); statistically significant.

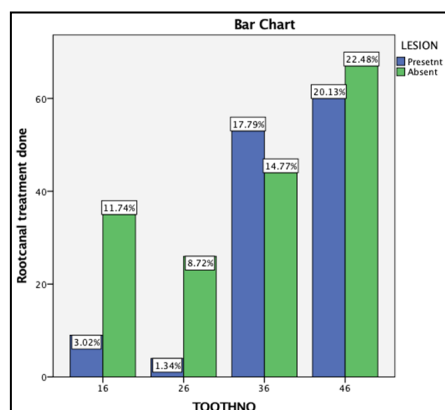
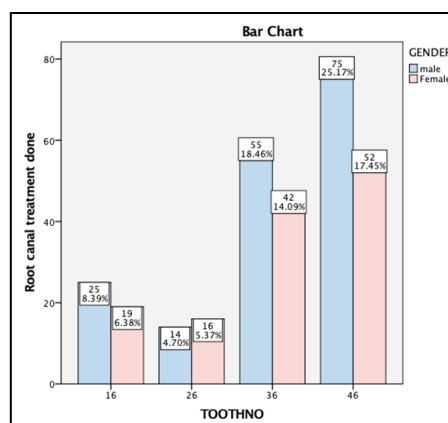


Figure 3. Depicts association between the tooth number with the gender. X axis represents tooth number and Y axis represents the gender. From the present graph it can be inferred that males had undergone more RCTs in right mandibular molars of males and this association was no association found between the tooth number and gender (p value=0.678; chi square value= 1.517); statistically not significant.



al., also stated that the first permanent molar in the right mandible was treated more with RCTs compared to other first permanent molars [24]. Abdulaziz saad abumelha stated that the left permanent first molar has the most incidence of endodontics treatment molars [25]. Study by B.O Popoola states that dental caries as the most common reason for endodontic treatment in permanent first molars, mainly mandibular first molars [26].

The current study states that boys are more prone for RCTs in the first permanent molar. B.O Popoola states that there was a lack of gender preponderance due to different reasons for endodontic treatment [26]. Contradictory to this study, Amal H Abuaffan et al states that girls are more prone to caries than boys [1].

The study states that there is a significant difference between the tooth number and presence of lesion. There is no relevant studies stating about the tooth number and presence of lesion.

This study states that mostly lesions are present in the right mandibular first molar in children. Study by J Meirinhos states that maxillary first molars have a larger percentage of lesion in the adult population [27].

Limitations of this study include small sample size and subjective bias. Future study should be conducted with a wide range of population.

Conclusion

From the present study, we can conclude that the right mandibular first molar is the most common tooth indicated for RCT and boys are affected comparatively more than girls. Awareness should be created among parents about the complications caused due to dental caries and also about the oral hygiene status.

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References

- [1]. Abuaffan AH, Hayder S, Hussen AA, Ibrahim TA. Prevalence of dental caries of the first permanent molars among 6-14 years old Sudanese children. *Indian J Dent Educ.* 2018 Jan;11:13-6.
- [2]. Luca R, Stanciu I, Ivan A, Vinereanu A. Knowledge on the first permanent molar-audit on 215 Romanian mothers. *OHDMBSC.* 2003;2(4):27-32.
- [3]. El Meligy OA, Al Nowaiser AM, Al Sheikh LA, Caliwig NO. Decision-making in the management of badly decayed first permanent molars in children and adolescents. *J Dent Oral Care Med.* 2016;2(3):302.
- [4]. Moynihan P, Petersen PE. Diet, nutrition and the prevention of dental diseases. *Public Health Nutr.* 2004 Feb;7(1a):201-26.
- [5]. Dhar V, Bhatnagar M. Dental caries and treatment needs of children (6-10 years) in rural Udaipur, Rajasthan. *Indian J Dent Res.* 2009 Jul-Sep;20(3):256-60. Pubmed PMID: 19884704.
- [6]. Leung RL, Loesche WJ, Charbeneau GT. Effect of Dycal on bacteria in deep carious lesions. *J Am Dent Assoc.* 1980 Feb 1;100(2):193-7.
- [7]. Research CM, Case Medical Research. Prevalence of Dental Caries in A group of Egyptian Children Using Caries Assessment Spectrum and Treatment [Internet]. Case Medical Research. 2020. Available from: <http://dx.doi.org/10.31525/ct1-nct04285931>
- [8]. Boucher Y, Matossian L, Rilliard F, Machtou P. Radiographic evaluation of the prevalence and technical quality of root canal treatment in a French subpopulation. *Int Endod J.* 2002 Mar;35(3):229-38. Pubmed PMID: 11985674.
- [9]. Prabakar J, John J, Srisakthi D. Prevalence of dental caries and treatment needs among school going children of Chandigarh. *Indian J Dent Res.* 2016 Sep-Oct;27(5):547-552. Pubmed PMID: 27966516.
- [10]. Prabakar J, John J, Arumugham IM, Kumar RP, Sakthi DS. Comparative Evaluation of the Viscosity and Length of Resin Tags of Conventional and Hydrophilic Pit and Fissure Sealants on Permanent Molars: An In vitro Study. *Contemp Clin Dent.* 2018 Jul-Sep;9(3):388-394. Pubmed PMID: 30166832.
- [11]. Prabakar J, John J, Arumugham IM, Kumar RP, Srisakthi D. Comparative Evaluation of Retention, Cariostatic Effect and Discoloration of Conventional and Hydrophilic Sealants - A Single Blinded Randomized Split Mouth Clinical Trial. *Contemp Clin Dent.* 2018 Sep;9(Suppl 2):S233-S239. Pubmed PMID: 30294150.
- [12]. Kumar RP, Vijayalakshmi B. Assessment of fluoride concentration in ground water in Madurai district, Tamil Nadu, India. *Res J Pharm Technol.* 2017;10(1):309-10.
- [13]. Kannan SSD, Kumar VS, Rathinavelu PK, Indiran MA. AWARENESS AND ATTITUDE TOWARDS MASS DISASTER AND ITS MANAGEMENT AMONG HOUSE SURGEONS IN A DENTAL COLLEGE AND HOSPITAL IN CHENNAI, INDIA [Internet]. *Disaster Management and Human Health Risk V.* 2017. Available from: <http://dx.doi.org/10.2495/dman170121>
- [14]. Kumar RP, Preethi R. Assessment of Water Quality and Pollution of Porur, Chembarambakkam and Puzhal Lake. *Res J Pharm Technol.* 2017;10(7):2157-9.
- [15]. Samuel SR, Acharya S, Rao JC. School Interventions-based Prevention of

- Early-Childhood Caries among 3-5-year-old children from very low socio-economic status: Two-year randomized trial. *J Public Health Dent.* 2020 Jan;80(1):51-60. Pubmed PMID: 31710096.
- [16]. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of *Streptococcus mutans*, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial. *Clin Oral Investig.* 2020 Sep;24(9):3275-3280. Pubmed PMID: 31955271.
- [17]. Khatri SG, Madan KA, Srinivasan SR, Acharya S. Retention of moisture-tolerant fluoride-releasing sealant and amorphous calcium phosphate-containing sealant in 6-9-year-old children: A randomized controlled trial. *J Indian Soc Pedod Prev Dent.* 2019 Jan-Mar;37(1):92-98. Pubmed PMID: 30804314.
- [18]. Pavithra RP, Jayashri P. Influence of Naturally Occurring Phytochemicals on Oral Health. *Res J Pharm Technol.* 2019;12(8):3979-83.
- [19]. Neralla M, Jayabalan J, George R, Rajan J, MP SK, Haque AE, et al. Role of nutrition in rehabilitation of patients following surgery for oral squamous cell carcinoma. *Int. J. Res. Pharm. Sci.* 2019 Oct 16;10(4):3197-203.
- [20]. Prabakar J, John J, Arumugham IM, Kumar RP, Sakthi DS. Comparing the Effectiveness of Probiotic, Green Tea, and Chlorhexidine- and Fluoride-containing Dentifrices on Oral Microbial Flora: A Double-blind, Randomized Clinical Trial. *Contemp Clin Dent.* 2018 Oct-Dec;9(4):560-569. Pubmed PMID: 31772463.
- [21]. Mohapatra S, Kumar RP, Arumugham IM, Sakthi D, Jayashri P. Assessment of Microhardness of Enamel Carious Like Lesions After Treatment with Nova Min, Bio Min and Remin Pro Containing Toothpastes: An in Vitro Study. *Indian J Public Health Res Dev.* 2019;10(10):375-80.
- [22]. Leelavathi L. Nicotine Replacement Therapy for Smoking Cessation-An Overview. *Indian J Public Health Res Dev.* 2019 Nov 1;10(11).
- [23]. Pratha AA, Prabakar J. Comparing the effect of Carbonated and energy drinks on salivary pH-In Vivo Randomized Controlled Trial. *Res J Pharm Technol.* 2019;12(10):4699-702.
- [24]. Demirbuga S, Tuncay O, Cantekin K, Cayabatmaz M, Dincer AN, Kilinc Hİ, et al. Frequency and distribution of early tooth loss and endodontic treatment needs of permanent first molars in a Turkish pediatric population. *Eur J Dent.* 2013 Sep;7(Suppl 1):S099-S104. Pubmed PMID: 24966738.
- [25]. Abumelha AS, Alhammadi AA, Alshahrani EA, Alsafi ZA, Ain TS. Incidence of endodontically treated first permanent molar teeth among Saudi children subpopulation. *J Int Oral Health.* 2018 Sep 1;10(5):250.
- [26]. Popoola BO, Ayebamero OE, Olanloye OM. ENDODONTIC TREATMENT IN CHILDREN: A FIVE-YEAR RETROSPECTIVE STUDY OF CASES SEEN AT THE UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA. *Ann Ib Postgrad Med.* 2018 Dec;16(2):136-141. Pubmed PMID: 31217771.
- [27]. Meirinhos J, Martins JNR, Pereira B, Baruwa A, Gouveia J, Quaresma SA, et al. Prevalence of apical periodontitis and its association with previous root canal treatment, root canal filling length and type of coronal restoration - a cross-sectional study. *Int Endod J.* 2020 Apr;53(4):573-584. Pubmed PMID: 31749154.