



PREVALENCE OF PULPECTOMY PROCEDURES IN PRIMARY TEETH- A RETROSPECTIVE ANALYSIS

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Abstract: Aim: To analyse common teeth undergoing pulpectomy among children attending a private dental institution in Chennai, India.

Materials and methods: Data regarding pulpectomy procedures in a private dental hospital which were completed between June 2019 to March 2020 were retrieved after analysing the case sheets. Data that was retrieved then were evaluated by 2 viewers. Incomplete cases or double entry cases were excluded from this study.

Results: This current study showed that boys were highly prevalent for pulpectomy treatment compared to girls populations with percentages of 58.6% and 41.4% respectively. Younger children who are less than 5 years old were frequently undergoing pulpectomy compared to older children.

Conclusion: Within the limit of our study, it can be seen that male children more frequently undergo pulpectomy compared to females. Mandibular teeth were more common to be treated with pulpectomy than maxillary teeth. Based on the group of teeth, posterior teeth were more highly prevalent than anterior teeth. Individually, incisors were the most commonest teeth being treated with pulpectomy in maxillary arch whereas first and second molars teeth in the mandibular arch.

Clinical significance: The research highlights the most common teeth which require pulpectomy procedure in both the arch. In maxillary arch central and lateral incisors are most commonly treated with pulpectomy, while in mandibular arch 1st and 2nd molar is commonly indicated for pulpectomy procedure.

Keywords: Children; Maxillary central incisors ; Pulpectomy; Primary teeth; Posterior teeth, Novel.

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INTRODUCTION

Dental caries is a disease in which bacteria will progressively damage teeth exposed to saliva and it is one of the most common oral diseases and most prevalent type of oral disease among children in the world [1,2]. This disease not only can cause damage to the teeth but it can also lead to several morbid conditions of oral cavity and other systems of the body [3]. Decreased in fluoride concentration may increase the risk for dental caries [4]. Salivary malondialdehyde levels can be used as diagnostic tools to diagnose early childhood caries [5]. Oral health is an important component and there is also evidence regarding inter-relationship between general health and oral health. Dental caries is a major problem in many developing countries and it is affecting over 60-90% of the school children and also the adult population [6]. Dental caries also have been associated with diet for centuries. Diet

probably received more attention than any other factor in the field of research into caries etiology. The best known research project about diet and caries is from [7] concluded that frequency and nature of sugar intake had marked influence on caries activity. There is no doubt that dietary and oral hygiene habits are correlated with income, education and social environment. Lots of literature exists on the status of dental caries among Indian population. Its prevalence has increased over the last couple of decades despite several attempts to cure and prevent the disease. Even though preventive measures have reduced caries, premature loss of pulpally involved primary teeth remains a constant problem. Mesial shift of permanent teeth also can cause malocclusions. Arch space is preserved by the retention of pulpally involved primary teeth for space maintenance if the tooth still can be saved. Pulpectomy is a conservative approach for the prevention of early loss of primary teeth. The negative consequences for premature loss of primary teeth includes insufficient space for erupting permanent teeth, impaction of premolars, and mesial tipping of permanent teeth adjacent to the lost primary teeth. Pulpectomy acts as an important procedure to retain primary teeth. The retained primary teeth can be beneficial for many years if it is not associated with severe root resorption or aligned in a severe infra-occlusion. Sometimes this long term retained method cannot be applied to all cases. Retaining primary molars until the child becomes sufficiently mature is important for complete facial growth. Pulpectomy of primary teeth is considered as a reasonable treatment approach to ensure either normal shedding or long term survival in instances of retention rather than extraction of teeth [8]. Use of rotary instrumentation for pulpectomy is a recent emerging concept in pedodontics [9]. Rotary instrumentation was recommended for its ability to provide conical-shaped canals and reduced the instrumentation time

when compared to hand instrumentations in primary teeth [10] [11]. A marked reduction in instrumentation time and superior quality of obturation was found with the rotary Kedo-SG Blue file system followed by Kedo-SH, Kedo-S [12] and hand K-files [13] and H files [14]. The least post-operative pain was found in the Mtwo group followed by the Kedo-S group and K-file group [15][16][17][18][19][20][21]. Previously our team has a rich experience in working on various research projects across multiple disciplines [22–31]. Now the growing trend in this area motivated us to pursue this project. The aim of this study is to analyse common teeth undergoing pulpectomy among children attending a private dental institution in Chennai, India. [17]

MATERIALS AND METHODS

A university set up was selected for this study which provided easy accessibility to data and provided a population with similar ethnicity sample population with similar ethnicity. Case records were retrieved by analysing 86000 case sheets between June 2019 to March 2020. Approval for this study was obtained from the institutional ethical committee (IEC) with approval number of SDC/SIHEC/2020/DIAS DATA/0619-0320. A total of 2468 sample sizes were included in this study. Complete case reports were taken into this study. Incomplete case records were eliminated. Sampling bias minimised by verifying absence or presence of pulpectomy treatment in case report. All data was verified by a single trained examiner. Data regarding age, gender, presence or absence of pulpectomy treatment were retrieved and tabulated in Microsoft Excel. All data was then transferred to SPSS software. Independent variables such as gender and age were confirmed. Dependent variables were whether patients had done pulpectomy treatments. Tables and bar charts were obtained

RESULTS

A total of 2468 sample sizes were included in which 1028 (41.4%) were females and 1458 (58.6%) were males. Males are more prevalent for pulpectomies compared to females as for the period of June 2019 to March 2020. This indicates that males have higher risk for dental caries in comparison to females. For distribution of maxillary teeth based on age, it can be observed that younger children had undergone more pulpectomies compared to older children. Younger children who are aged less than 5 years old most frequently had pulpectomies on incisors teeth with value of 490 and least frequent in canines with value of 83. For older children, results revealed that 1st molars teeth were the most commonest teeth undergone pulpectomies and incisors were the least one that underwent pulpectomies with value of 31 [Graph 1 & Table 1].

Distribution of maxillary teeth based on gender revealed that incisors teeth had been the highest prevalent for pulpectomies among females and males with a value of 211 and 311, followed by 1st molars (169 and 238), 2nd molars (67 and 101) and canines (45 and 71) [Graph 2 & Table 2]. Comparison between age of the child and type of tooth affected in the mandibular showed that 2nd molars teeth to be the most affected with a total value of 596 followed by 1st molars with total value of 571 respectively. The least affected mandibular teeth were incisors with a total value of 39.

Younger children accounted for a total value of 35 and older children accounted for a total value of 4 [Graph 3 & Table 3]. Comparison between gender of the child and type of tooth affected in the mandibular revealed that females mostly underwent pulpectomy on 2nd molars with value of 267 and incisors were the least commonest type of teeth that need to be treated with pulpectomy having a total value of 13. For males, 1st molars were the most commonest teeth that needed to undergo pulpectomy followed by 2nd molars with value of 329, canines and incisors with value of 40 and 26 respectively [Graph 4 & Table 4]. Based on comparison between the age of the child and the group of teeth affected, it can be concluded that younger children aged less than 5 years old were mostly being affected compared to older children with a total value of 1785 and 701 respectively. Lower posteriors are mostly treated with pulpectomy for both groups of children with values of 744 for younger children and 701 for older children [Graph 5 & Table 5].

Based on comparison between the gender of the child and the group of teeth affected, it can be observed that males mostly undergo pulpectomy compared to females with a total value of 1458 and 1028 respectively. For the group of teeth, lower posteriors are mostly treated with pulpectomy compared to other teeth like upper anteriors (638), upper posteriors (575) and lower anteriors (106) [Graph 6 & Table 6]. Based on prevalence of pulpectomy treatment among gender, it can be concluded that younger children had higher prevalence for pulpectomy than older children with a percentage value of 71.8% and 28.2% respectively.

DISCUSSIONS

In the current study, males are more prevalent for pulpectomy compared to females with a percentage of 58.6% and 41.4% respectively. Therefore, it can be suggested that males had higher risk to be affected with severe dental caries compared to females. This finding is similar to study from Doering et al [32]. It was in contrast with a study done by MS Ullah et al [33] which reported that females had higher prevalence for severe dental caries than males. Interarch comparison showed that severe dental caries are more prevalent on mandibular arch rather than maxillary arch especially posterior teeth. Studies from Rahman et al [6] and Rajesh et al [34] showed the same result. In contrast with findings from P.V Sathe et al [35] who reported that maxillary teeth are more prone towards severe dental caries and pulpectomy when compared to mandibular teeth.

Posterior teeth in the mandibular arch were the most commonest group of teeth being treated with pulpectomy treatment if compared to other groups of teeth such as upper anteriors, upper posteriors and lower anteriors. This can be due to their complex morphological nature compared to others. In addition, tissue topography of molars and pits and fissure in primary molars also are slightly deeper than others. In the present study, it can be concluded that younger children which are below 5 years of age mostly undergo pulpectomy compared to older children. This can be due to the facts that they are still young and less knowledgeable than older children. Moreover, they are still young to take care of oral hygiene on their own. Therefore, parents should be more responsible towards their children and dental practitioners should also give more attention to parents in educating them about the long term consequences for not taking care of their child oral hygiene. [36]

Based on the comparison of the age of the child and type of teeth affected in maxilla, incisors teeth were the most affected in maxillary arch for both genders. This finding may be attributed to the fact that maxillary incisors were the commonest teeth affected for nursing caries. Children tend to sleep with bottles during bed time, when the milk gets accumulated on the buccal vestibule which can lead to caries on the maxillary incisors. While incisors were the least commonest to be treated with pulpectomy compared to other teeth in the mandibular arch. One of the reasons could be due to its position which was protected by the tongue and the opening of major salivary ducts.

The limitations of this study is that the sample sizes were small and it was single centre. Since it was retrospective study in nature, there were also possible manual errors during data collection. Further studies to be performed with focusing on multi centres and confirmation from few examiners were required to avoid manual errors during data collection. Our institution is passionate about high quality evidence based research and has excelled in various fields [37-43]. We hope this study adds to this rich legacy.

CONCLUSION

Within the limit of our study, it can be seen that males most frequently undergo pulpectomy compared to the females. Mandibular teeth were more common to be treated with pulpectomy than maxillary teeth. Based on the group of teeth, posterior teeth were more highly prevalent than anterior teeth. Individually, incisors were the most commonest teeth being treated with pulpectomy in maxillary arch whereas first and second molars teeth for mandibular arch.

Author contributions: All authors have equal contribution in bringing out this research work.

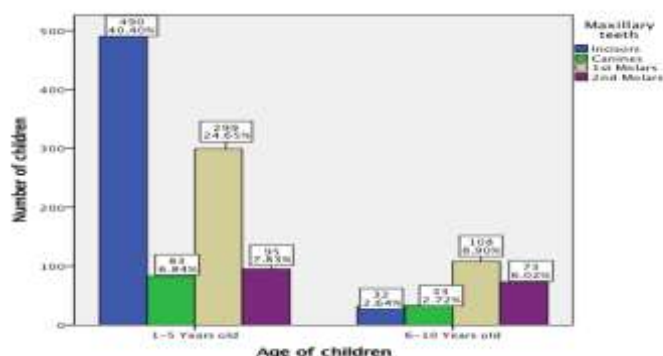
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Conflict Of Interest: Nil

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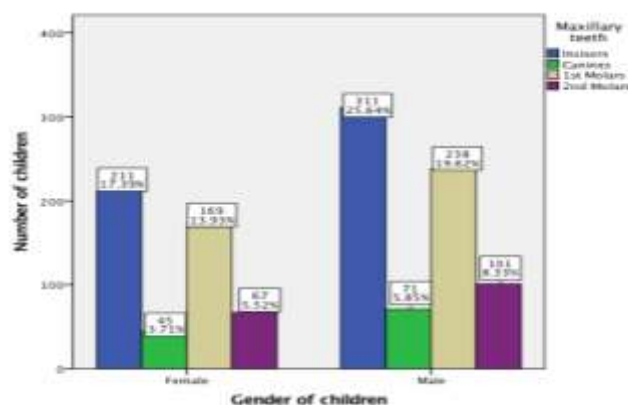


Bar chart 1: Bar graph represents association between age and types of teeth affected in maxillary arch where blue colour denotes incisors, green denotes canines, light brown denotes 1st molars and purple colour denotes 2nd molars. X axis represents the age of children and Y axis represents the number of children. Chi square test was done to evaluate the

association between age groups with type of teeth affected and the association was found to be statistically significant. Pearson chi square value - 135.079 , df-3,p value was 0.000 (<0.05) and hence it is statistically significant. It was noted that children aged 1-5 years old had a higher prevalence of pulpectomy in anteriors compared to children aged 6-10 years old.

Table 1. Comparison between age of the child and type of tooth affected in maxilla. The most common affected tooth in the age group of 1-5yrs were the maxillary incisors(n=490) followed by 1st molar (n=299). In the 6-10yrs old group the st molar (n=108) and 2nd molar (n=73) showed much higher prevalence compared to incisors (n=31) which showed a highly significant variation (Chi-square p=0.000)

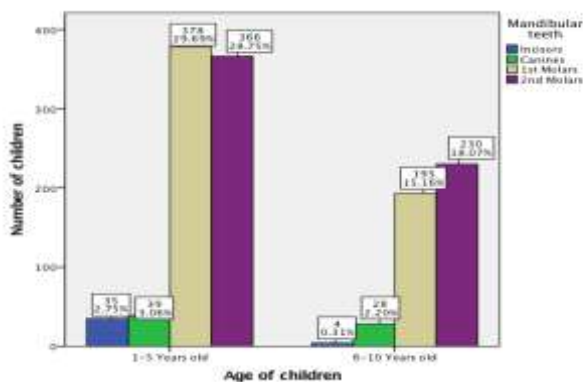
Age	Maxillary teeth				Pearson Chi- Square value, p value
	Incisors	Canines	1st Molars	2nd Molars	
1-5 yrs	490	83	299	95	135.079, p=0.000
6-10 yrs	31	33	108	73	
Total	521	116	407	168	



Bar chart 2: Bar graph represents association between gender and type of teeth affected in maxillary arch where blue colour denotes incisors, green denotes canines, brown denotes 1st molars and purple denotes 2nd molars. X axis represents the age of children and Y axis represents number of children. Chi square test was done and the association was found to be statistically not significant. Pearson chi square value - 0.342 , df-3,p value was 0.952(>0.05) and hence it is statistically not significant. More or less both genders showed equal distribution of caries in maxillary arch.

Table 2. Comparison between gender of the child and type of tooth affected in maxilla . Both the gender showed equal distribution with most common being the incisors (n=522) and least affected tooth were the canine (n=116) Chi-square test (p- 0.952)

Gender	Maxillary teeth				Pearson Chi- Square value, p value
	Incisors	Canines	1st Molars	2nd Molars	
Female	211	45	169	67	0.342, p=0.952
Male	311	71	238	101	
Total	522	116	407	168	

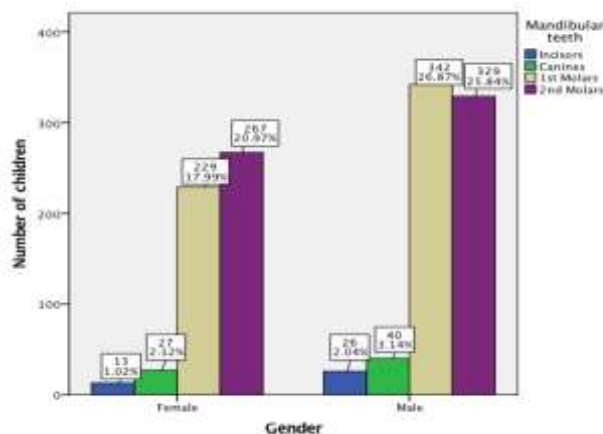


Bar chart 3: Bar graph represents association between gender and type of teeth affected in mandibular arch where blue colour denotes incisors, green colour denotes canines, light brown denotes 1st molars and purple denotes 2nd molars. X axis represents the age of children and Y axis represents the number of children. Chi square test was done to check the association between age with number of teeth affected and the association was found to be statistically significant. Pearson

chi square value -15.140 , df-3,p value was 0.02(<0.05) and hence it is statistically significant. It can be observed that children aged 1-5 years old were more likely to have caries in 1st molars teeth.

Table 3. Comparison between age of the child and type of tooth affected in mandibular. Children in the younger age group 1-5yrs showed more prevalence of caries required pulpectomy in 1st molar (n=378) and 2nd molar (n=366) compared to 6-10yrs old. The association was statistically significant with p value p=0.02.

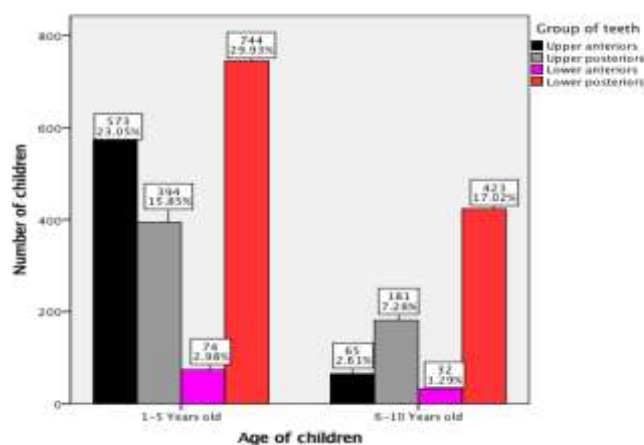
Age	Mandibular teeth				Pearson Chi- Square value, p value
	Incisors	Canines	1st Molars	2nd Molars	
1-5 yrs	35	39	378	366	15.140, p=0.02
6-10 yrs	4	28	193	230	
Total	39	67	571	596	



Bar chart 4: Bar graph represents association between gender and types of teeth affected in mandibular arch where blue colour denotes incisors, green colour denotes canines, light brown denotes 1st molars and purple colour denotes 2nd molars. X axis represents the age of the population and Y axis represents the number of children. Chi square test was done and the association was found to be statistically not significant. Pearson chi square value - 4.032, df-3,p value was 0.258 (>0.05) and hence it is statistically not significant. It can be seen that males had a higher prevalence for caries in 1st molars meanwhile females more prone for caries in 2nd molars although it is not significantly associated.

Table 4: Comparison between gender of the child and type of tooth affected in mandibular. Both the gender showed equal distribution of teeth affected, with more pulpectomy procedures required in 1st (n=571) and 2nd molar (n=596) compared to incisors (n=39) Chi-square analysis p=0.258.

Gender	Mandibular teeth				Pearson Chi- Square value, p value
	Incisors	Canines	1st Molars	2nd Molars	
Female	13	27	229	267	4.032, p=0.258
Male	26	40	342	329	
Total	39	67	571	596	

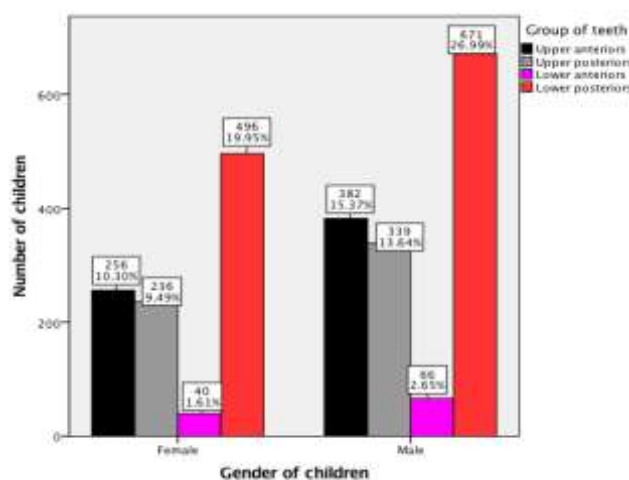


Bar chart 5: Bar graph represents association between age of children and group of teeth affected in which black colour denotes upper anteriors, grey colour denotes upper posteriors, light purple denotes lower anteriors and red colour denotes

lower posteriors. X axis represents the age of children and Y axis represents number of children. Chi square test was done and the association was found to be statistically not significant. Pearson chi square value -1.626 , df-3,p value was 0.653 (>0.05) and hence it is statistically not significant. It can be observed that children aged 1-5 years old had a higher prevalence for pulpectomy in lower posteriors although it is not statistically significant.

Table 5. Comparison between age of the child and group of teeth affected. Majority of children in the age group 1-5yrs had caries tooth which required pulpectomy procedures in lower mandibular arch (n=744) while in the 6-10yrs age group it was (n=423), the difference was not significant based on Chi-square analysis p=0.653.

Age	Group of teeth					Pearson Chi- Square value, p value
	Upper anteriors	Upper posteriors	Lower anteriors	Lower posteriors	Total	
1-5 yrs	573	394	74	744	1785	1.626, p=0.653
6-10 yrs	65	181	32	423	701	
Total	638	575	106	1167	2486	



Bar chart 6: Bar graph represents association between gender and group of teeth affected in which black colour denotes upper anteriors, grey colour denotes upper posteriors, light purple denotes lower anteriors and red denotes lower posteriors . X axis represents the gender of children and Y axis represents number of children. Chi square test was done which showed male predominance in caries tooth indicated for pulpectomy compared to females. Pearson chi square value -142.813 , df-3,p value was 0.000 (<0.05) and hence it is statistically significant. It can be concluded that males most commonly undergo pulpectomy in lower posteriors.

Table 6. Comparison between gender of the child and group of teeth affected. Male children (n=1458) were found to be significantly more affected with carious teeth indicated for pulpectomy compared to female children (n=1028).

Gender	Group of teeth					Pearson Chi- Square value, p value
	Upper anteriors	Upper posteriors	Lower anteriors	Lower posteriors	Total	
Female	256	236	40	496	1028	142.813, p=0.000
Male	382	339	66	671	1458	
Total	638	575	106	1167	2486	