

Pulpectomy Performed in Children between the Age Group of 5 to 10 Years: A Retrospective Study

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Abstract

Introduction: The difficulties in endodontics are due to the unique anatomy of primary teeth. To achieve a successful treatment, the dentist must have a thorough knowledge on the anatomy and morphology of primary teeth and the variations that may exist within them. A major goal in pediatric dentistry is the preservation of the integrity of primary teeth and their supporting tissues until the physiological process of exfoliation takes place. Pulpectomy serves such a purpose using various materials and techniques to fill the canals of primary teeth. **Materials & Methods:** The study consisted of children between the age of 5-10 years. Data was obtained from 86,000 patients who checked into the clinics from June 2019 to March 2020. From that, data of children who underwent pulpectomy was obtained and was 725 in number. All the case sheets were carefully reviewed. Data was tabulated and exported to SPSS software where the output was obtained later. **Results:** Sample size consisted of 725 patients and among them 43.3% were girls and 56.7% were boys, belonging to the age group of 5-10 years. Children of the age group of 5 years (43.31%) received the most treatment and children belonging to the age group of 10 years (56.69%) received the least treatment. Chi square test was done where p value=0.038 ($p < 0.05$) statistically significant. **Conclusion:** This study concludes that pulpectomy was performed more at the age of 5 years and less at the age of 10 years. The frequency of pulpectomy treatment done was more in boys compared to girls.

Keywords: Pulpectomy; Deciduous teeth; Caries; Pediatric endodontics

Introduction

Pulpectomy is a root canal procedure that is mainly for the pulp tissues that are irreversibly infected or necrotic. The canals are shaped and debrided and are dried and obturated with restorable material. ^[1]

In pediatric endodontics, zinc oxide eugenol is most commonly used in obturation technique and sometimes they may fail to meet the ideal requirements of obturation material. ^[2]

Aseptic root canal treatment and preparation determine the success of pulpectomy procedure in necrotic primary teeth. Radiography is the most commonly and widely used technique for root canal length determination. ^[3,4]

The use of radiography for this very purpose may not always lead to accurate results especially if there is resorption of primary teeth. Instrumentation is incorporated if there are any

mistakes in the measurement; hence the germ of the permanent tooth tends to get damaged. ^[5,6] The obturated material can be retained after natural exfoliation of primary teeth. ^[7] Sometimes poor coordination in children also makes it difficult to take radiographs of the accepted diagnostic values.

Sometimes there are certain limitations like radiographic interpretation and high possibility of over instrumentation of unevenly resorbed roots and even subsequent over filling. Hence the use of an electronic apex locator is recommended regardless of the stage of root resorption. ^[8]

Working length determination is a very relevant factor for the success of root canal treatment. The narrowest part of the root canal where widths of blood vessels are smaller and healing is attained, namely the apical foramen or apical constriction are

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prepared for getting better results. Radiographic methods can also have disadvantages such as superposition of anatomical structure and image distortion and also the film processing time.^[9] Pulpectomy is the preferred treatment of choice for non-vital primary teeth. It is done to avoid extraction and maintain normal function and form^[10,11] Root canal preparation in primary teeth is a challenging and time-consuming procedure. Various instrumentation techniques such as hand, reciprocating and rotary are used in primary teeth. Rotary instrumentation in pediatric dentistry is an emerging concept^[12] approximate working length.^[13,14] Apart from the meticulous cleaning and debridement of the root canal, the time taken for the treatment holds significance in pediatric dentistry, hence hand instruments were introduced.^[15]

One of the reasons for children to get affected by dental caries and undergo pulpectomy is the increased fluoride content in bottled drinking water.^[16] Risk factors for early childhood caries must be controlled.^[17] Depending on the extent of caries, quality of root canal filling must be assessed during treatment.^[18] Previously our team has a rich experience in working on various research projects across multiple disciplines.^[19-33] The aim of this study is to assess the frequency of pulpectomy treatment done in children between 5-10 years.

Methodology

The study is a single centred retrospective study based on the university setting of saveetha dental college.

The study was also approved by the institutional ethics board (SDC/SIHEC/2020/DIASDATA/0619-0320). Data of 86,000 patients was obtained who checked into the clinic from June 2019 to March 2020. Among those 86,000 patients, data of children within 5-10 years who underwent pulpectomy treatment was extracted. Total sample size was 725 patients who were subjected to pulpectomy treatment. Two reviewers were involved in this study, the guide as the primary reviewer and an external reviewer. The case sheets were reviewed individually and were verified with the help of photos and interim notes. Data was collected from patient management software under the pedodontics department column, pulpectomy treatment, single and multi-visit pulpectomy and the interim notes.

This data was entered in excel sheet which was later transferred to SPSS software SPSS version 21.0, SPSS, Chicago II, USA) version, for further analysis and to obtain the statistical results. To minimize sampling bias, all the datas available was included and no sorting was done. Internal validity included patients undergoing pulpectomy treatment.

External validity non probability inclusion. Chi square test was done for correlation. Independent variables were the patient details and dependent variables were gender and children undergoing pulpectomy. Exploratory data was the type of analysis done followed by correlation and association.

Results and Discussion

The data was tabulated in SPSS and descriptive statistics were obtained. Sample size consisted of 725 patients and among them 43.3% were girls and 56.7% were boys, belonging to the age group of 5-10 years. The frequencies were calculated. Figure 1 represents the frequency distribution of the age groups of children who visited the clinic for pulpectomy treatment, Figure 2 represents the frequency distribution of gender of the children and Figure 3 represents the correlation between age and gender of the children for pulpectomy treatment. Chi square test was done and p value 0.038 was obtained which is statistically significant. It is depicted that children of the age group 5 years have received the majority of pulpectomy treatment while the age group of 10 received the least.

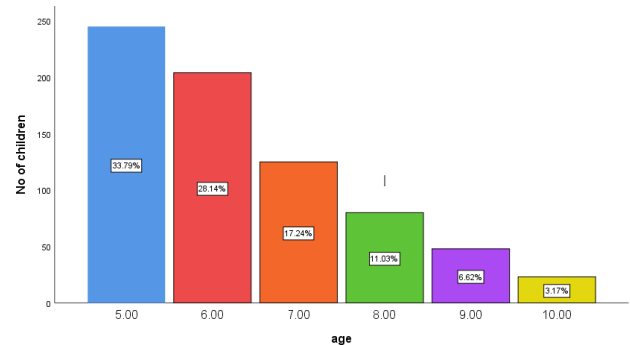


Figure 1: Bar graph showing frequency distribution of the age of children undergoing pulpectomy treatment. X axis represents the age and Y axis represents the total number of children. The age group range is between 5 to 10 years. Children undergoing pulpectomy treatment were more at the age of 5 years (Blue) followed by 6 years (Red) and less at the age of 10 years (Yellow).

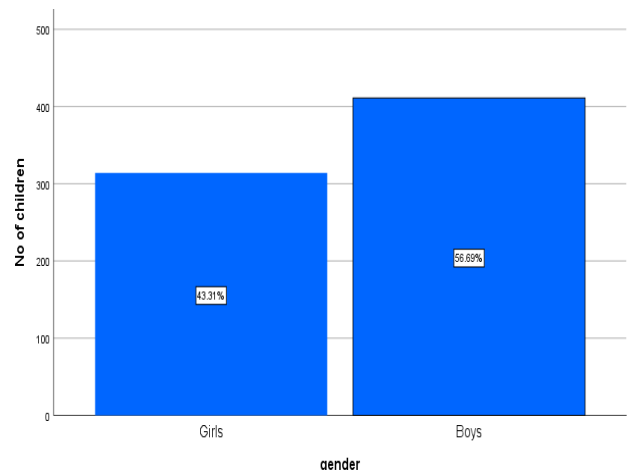


Figure 2: Showing the gender of the children. X axis represents gender and Y axis represents total number of patients. Boys (56.69%) underwent more number of pulpectomy treatment compared to girls (43.31%).

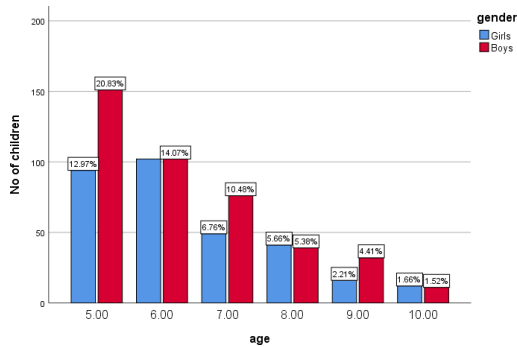


Figure 3: Showing the correlation between the age and gender of the children between age groups 5-10 years. X axis represents the age and Y axis represents the total number of children. Red represents the frequency of boys and blue represent the frequency of girls. Pulpectomy treatment at the age of 5, 7 and 9 years were performed more in boys compared to girls and at the age of 8,10 years pulpectomy was performed more in girls compared to boys. There is a statistically significant difference between the age and gender of children undergoing pulpectomy treatment. Chi-square test, $p=0.038$ ($p>0.05$), statistically significant.

One of the most significant steps to a successful root canal treatment is to determine the length of the root canal accurately. Root resorption generally makes the apex of the root canals in primary teeth ambiguous. Radiography is globally the most trustworthy and accessible method. However exposure on repeated radiographs to children before, during and after the endodontic treatment may arises concerns. Some studies have reported that, both the digital radiograph as well as the apex locator were similar, so the intra class correlation coefficient also showed that both the radiographic and electronic methods are reliable and there is no need to use them together. [34,35] In a study by Subramanian et al, root canal lengths were measured in 4 different techniques using radiographs and apex locators and moreover they increase the safety and comfort in children. [36] In case the electronic means are unavailable, conventional radiography is the best alternate as the results are satisfactory. [37] Resorption in deciduous posterior teeth did not affect the accuracy of root canal measurement. [38]

Apex locators are however useful in primary root canal therapy in case other diagnostic measures support them. [39] Apex locators are more likely to miscalculate compared to radiographs. [40-48]

Tooth clearing has been employed to obtain information on endodontic treatment including morphology, various techniques and demineralizing agents in primary molars. [49,50] Management of pediatric oral diseases also is important while treating children. [51] Looking into the negligence of oral hygiene by the parents is also important to note. [52] Dentists can recommend special toothbrushes that are chewable to remove plaque to avoid incidence of caries. [53,54]

The limitations of this study include:

- Assessment of working lengths were not compared.
- Root canal morphology was not assessed.
- Large sample was not available.

Future scope of this study includes various diagnostic aids assessment, comparison of root canal morphology and working lengths.

Conclusion

Within the limitation of the study, we conclude that children at the age 5 years received more pulpectomy treatment. The frequency of pulpectomy performed was more in boys compared to girls.

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