



Original Research

Pulpotomy v/s pulpectomy in 6 to 9 years old children

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ABSTRACT

Background: The main goal of pulp treatment is to preserve the health and integrity of the oral tissues. Early primary tooth loss can result in malocclusion and temporary or permanent issues with appearance, phonetics, and function. While it is desirable to try to maintain pulp vitality wherever possible, the pulp can be completely removed without seriously impairing the tooth's ability to function.

Aim: To compare the prevalence of pulpectomy and pulpotomy procedures done in 6 to 9 years old children

Materials and method: The study was a retrospective cross-sectional analysis, evaluating dental outpatient records and analyzing data from 86,000 patients between June 2020 and April 2021 to collect case records of 6 to 9-year-old children undergoing pulpectomy and pulpotomy procedures. We selected children between the ages of 6 and 9 who underwent pulpectomy and pulpotomy procedures. Using the SPSS software, the data was compiled followed by statistical analysis.

Results: Of the total number of children screened, about 96% of the patients between 6-9 years of age underwent pulpectomy whereas the remaining 4% underwent pulpotomy. Of these patients, 56% of them were males and about 44% of them were females. About 75% of these pulpectomy procedures were performed in posterior teeth whereas only 25% of them were done in anterior teeth

Conclusion: From this study it can be concluded that in a university setting, pulpectomy was most predominantly performed in children of 6-9 years of age and the most commonly involved teeth were the posteriors.

Keywords: Primary teeth, Pulpectomy, Pulpotomy

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INTRODUCTION

When a child has caries and their primary tooth has irreparably damaged pulp tissue, endodontic therapy is thought to be their last resort for saving the tooth. In order to prevent extraction, pulpectomy aims to maintain teeth in a pain-free state until they are naturally replaced by their successor during the transition from primary to permanent dentition¹. This is justified by first removing the irreversibly inflamed or necrotic radicular pulp tissue by chemical and mechanical means. Next, a root canal filling is placed using a material that is capable of resorb at the same rate as the original tooth and be swiftly removed in case that it is inadvertently extruded through the apex². It is undoubtedly crucial, but the primary pulp that bleeds heavily following the removal of the coronal pulp without any further clinical or radiographic signs and symptoms is inflamed³. Since it is challenging to assess the level of inflammation in the radicular region, pulpectomy procedures ought to be performed in these hyperemic pulps⁴. However, total pulp elimination is not guaranteed since it is challenging to accomplish optimal biomechanical debridement of major root canals, resulting in the localization of pulpal tissue remnants in certain inaccessible regions⁵

Pulpotomy is the most often used therapy for cariously exposed pulps in primary molars without symptoms, even though there is growing evidence of the effectiveness of Indirect Pulp therapy (IPT) in both the permanent and primary dentition⁶. Preserving the radicular pulp, preventing discomfort and edema, and ultimately keeping the tooth while maintaining the integrity of the arch are the goals of this treatment⁷. According to published research, when corresponding primary teeth have pulpectomy, it may affect the permanent teeth's eruption time and orientation⁸. In many clinical settings, pulp therapy of primary teeth is a suitable alternative for extraction. Therefore, conservative treatment approaches are frequently utilized to manage both symptomatic and asymptomatic teeth when decay advances to involve the dental pulp⁹. Mineral trioxide aggregate (MTA), biodentine (BD), formocresol (FC), ferric sulphate (FS), and calcium hydroxide (CH) are the agents that are most commonly employed¹⁰.

Dental caries is one of the most common chronic disorders in children worldwide. Direct pulp capping was more economical for younger patients and occlusal exposure sites, while root canal therapy (RCT) was more successful for older patients or teeth with proximal exposures, according to a Schwendicke et al study¹¹. Pulp interventions include both a medicinal and a pulp therapy method. Preserving the tooth's integrity and the health of its supporting tissues is the fundamental goal of pulp interventions¹². Our group's wealth of knowledge and research expertise has resulted in numerous high-caliber papers

Hence this study aimed to assess the prevalence of pulpectomy and pulpotomy procedures done in 6 to 9-year-old children.

MATERIALS AND METHODS

Study Setting:

This study is a retrospective analysis of patients who saw the Saveetha Dental College and Hospitals' pedodontics department between June 2020 and April 2021. The Institution Ethics Board granted consent for this research setting. The sample size of $n = 3566$ patients was selected such that the inclusion of photos for verification might reduce sampling bias. Two reviewers evaluated the study, and their reviews were cross-checked. The statistical study includes all patient records undergoing pulpotomy and pulpectomy between the ages of 6 and 9. The study did not include cases where the system had incomplete data record

Data Collection:

By examining patient records and examining data from 86,000 patients, the case records of patients receiving pulp therapy were gathered. These patients' data was gathered and tallied. It had the following

parameters: Patient ID, Age, Gender, Tooth Number, and kind of pulp therapy treatment. There were four age groups: six, seven, eight, and nine years. Pulpotomy and pulpectomy were the two types of pulp treatment performed.

Statistical Analysis:

Using the SPSS v23.0 program, all of the parameters were tabulated and evaluated for statistical significance. In the analysis, characteristics such as percentage, mean, standard deviation, and frequency were used. The relationship between age, gender, the teeth involved, and the treatment given was examined using the Chi-square test. P-values below 0.05 were regarded as statistically significant.

RESULTS

A total of 3,566 patients were screened for this investigation. As a proportion of all patients screened, about 96% of the patients between 6-9 years of age underwent pulpectomy whereas the remaining 4% underwent pulpotomy [Figure 1]. Out of all the 3,437 patients undergoing pulpectomy 35% of the patients in this group were 9 years old, 27% were 8 years old, 20% were 6 years old, and 18% were 7 years old, indicating that the majority of the patients in this group were in the 9–18 year age range. [Figure 2]. Of these patients, 56% of them were males and about 44% of them were females [Figure 3]. About 75% of these pulpectomy procedures were performed in posterior teeth whereas only 25% of them concerned the anterior teeth. [Figure 4].

Among the 129 pulpotomy procedures done, 41% of the patients in this group were 9 years old, 24% of them were 7 years old, 19% of them were 6 years old and 16% of them were 8 years old [Figure 5]. Of these patients, about 50% of were males and 50% of them were females [Figure 6]. About 92% of these pulpotomy procedures were done in posterior teeth and only 8% of these were performed in an anterior tooth [Figure 7].

On doing a chi-square association between the type of treatment rendered and the teeth involved, it was found that 74% of the total pulpectomy procedures were done in posterior teeth and only 26% of the procedures were done in anterior teeth. It was also found that about 92% of the pulpotomy procedures were done in posterior teeth whereas 9% of the procedures were done in anterior teeth. There was a significant association seen with a p-value of $0.000 < 0.05$ [Table 1].

Teeth involved	Group 1 (Pulpectomy)	Group 2 (Pulpotomy)	Chi square value	P value
Anterior teeth	906 (26%)	10 (9%)	22.554	0.000<0.05
Posterior teeth	2531 (74%)	119 (92%)		

Table 1: Table showing the chi square association between the type of treatment rendered and the teeth involved.

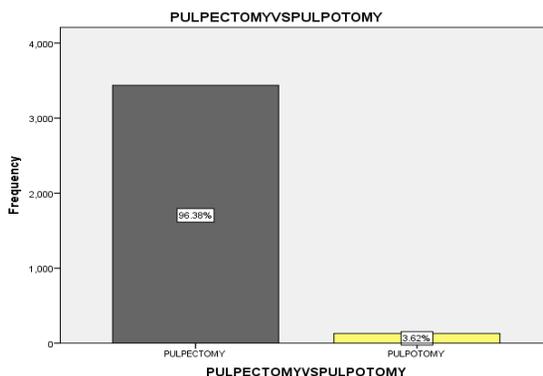


Figure 1: Bar chart representing the prevalence of pulp therapy procedures among children of age 6-9 years. X axis represents the type of procedure and Y axis represents the frequency of patients undergoing pulp therapy procedures. The colour grey represents pulpectomy and yellow represents pulpotomy. The graph shows that pulpectomy was performed more predominantly among the children of age group 6-9 years.

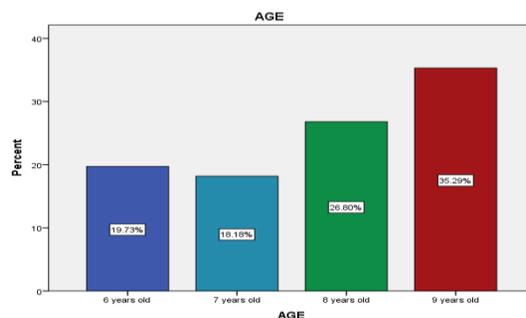


Figure 2: Bar chart representing the prevalence of pulpectomy done among different age groups of patients. X axis represents the age of the patients and the Y axis represents the frequency of patients undergoing pulpectomy procedures. The colour dark blue represents the age of 6 years, light blue represents 7 years, green represents 8 years and red represents 9 years. The graph shows that pulpectomy was performed more predominantly among children of age 9 years.

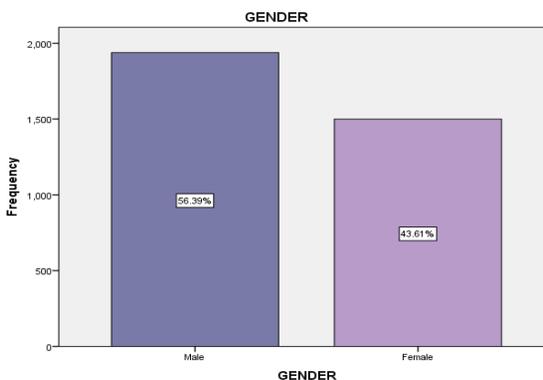


Figure 3: Bar chart representing the prevalence of pulpectomy among different genders of patients. The x axis represents the gender and the Y axis represents the frequency of patients undergoing pulpectomy procedures. The colour dark purple represents males and light purple represents females. The graph shows that pulpectomy was performed more predominantly among males.

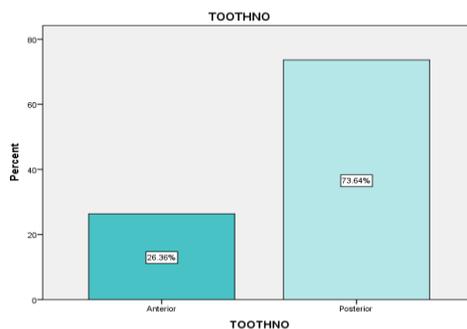


Figure 4: Bar chart representing the prevalence of pulpectomy in different teeth numbers. The x axis represents the teeth involved and the Y axis represents the frequency of patients undergoing pulpectomy procedures. The colour dark blue represents anterior teeth and light blue represents posterior teeth. The graph shows that pulpectomy was performed more predominantly in posterior teeth.

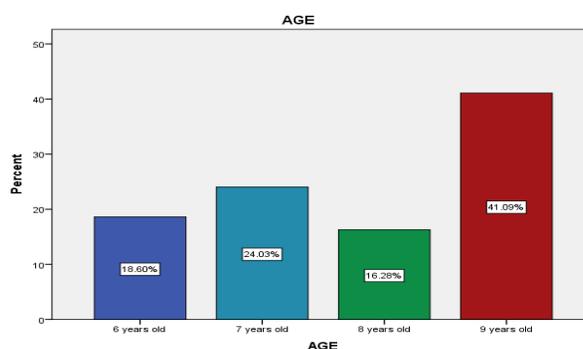


Figure 5: Bar chart representing the prevalence of pulpotomy done among different age groups of patients. The x axis represents the age of the patients and the Y axis represents the frequency of patients undergoing pulpotomy procedures. The colour dark blue represents the age of 6 years, light blue represents 7 years, green represents 8 years and red represents 9 years. The graph shows that pulpotomy was performed more predominantly among children of age 9 years.

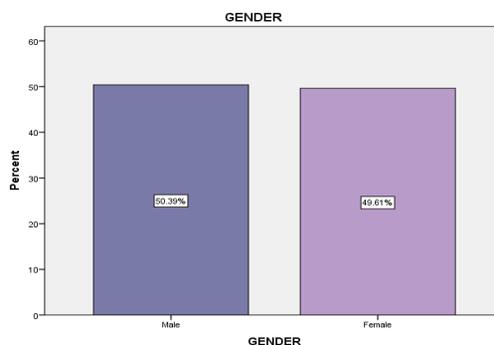


Figure 6: Bar chart representing the prevalence of pulpotomy among different genders of patients. The x-axis represents the gender and Y-axis represents the frequency of patients undergoing pulpotomy procedures. The colour dark purple represents males and light purple represents females. The graph shows that pulpotomy was performed more predominantly among males.

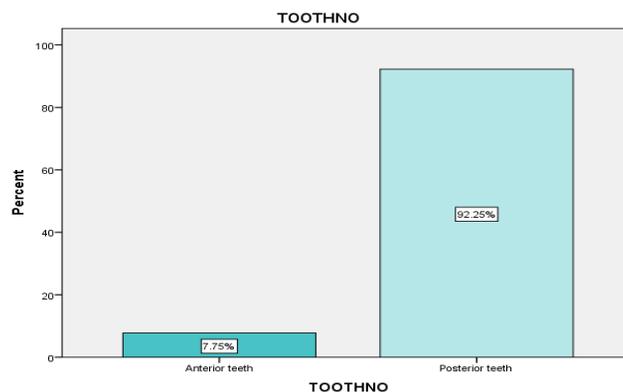


Figure 7: Bar chart representing the prevalence of pulpotomy in different teeth numbers. The x axis represents the teeth involved and the Y axis represents the frequency of patients undergoing pulpotomy procedures. The colour dark blue represents anterior teeth and light blue represents posterior teeth. The graph shows that pulpotomy was performed more predominantly in posterior teeth.

Teeth involved	Group 1 (Pulpectomy)	Group 2 (Pulpotomy)	Chi-square value	P value
Anterior teeth	906 (26%)	10 (9%)	22.554	0.000<0.05
Posterior teeth	2531 (74%)	119 (92%)		

Table 1: Table showing the chi square association between the type of treatment rendered and the teeth involved.

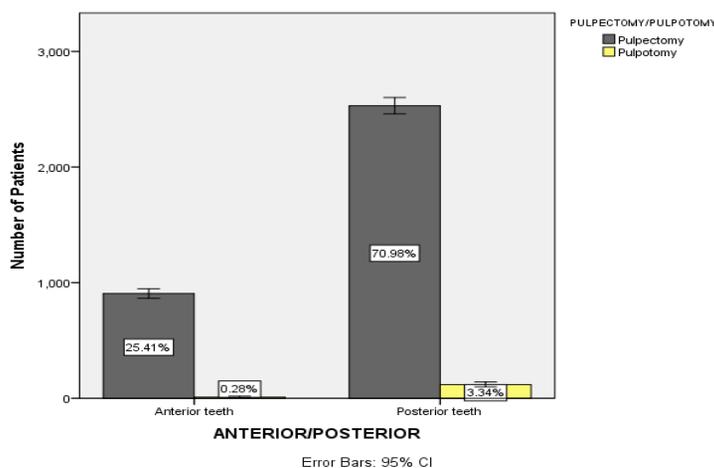


Figure 8: Comparison between the type of pulp therapy rendered and teeth involved. X axis represents the teeth involved and Y axis represents the type of pulp therapy. Grey color represents pulpectomy and yellow color represents pulpotomy.

DISCUSSION

The dental pulp, a delicate connective tissue enclosed by the hard walls of the dentin, is crucial to the tooth's fate but is frequently disregarded. When the pulp is exposed for any number of causes, such as dental caries, fractures, fissures, or an exposed restoration margin, the pulp becomes inflamed. If this inflammation is not addressed right away, the pulp may eventually die¹³. Essential pulp therapies such as direct and indirect pulp capping, pulpotomy in the early stages, or pulpectomy, if the lesion shows up in its later stages, are among the therapies for dental pulp illnesses. Maintaining pulpal vitality is critical because a healthy, functional pulp may start several critical processes, including dentin development, give the tooth nutritional support, permit defense, and have a special ability for reparation.¹⁴ It is therefore better to leave the pulp intact rather than replacing it with an inert root filler.

When a child has a pulpectomy for an infected primary tooth, the main goal is to eradicate any germs and stop reinfection. This will facilitate the repair of the periradicular tissues and lessen the child's pain and suffering. Compared to permanent teeth, primary teeth exhibit weaker protection against root resorption. The increased vascularity of the pulp can be the reason for the higher inflammatory tendency of primary pulps. Reduced dentin thickness, increased permeability, weakened main roots, and decreased hardness and strength of the roots all contribute to the faster development of infectious processes in the pulp tissues, which can cause an inflammatory response and root resorption.^{15,16}

Pulpotomy therapy aims to create a strong biological seal by preventing germs from entering the exposed pulp tissue. This allows the pulp tissue to repair by forming a new dentinal bridge and promoting periapical tissue regeneration. The selection of the appropriate biomaterial in terms of its biocompatibility is critical to the success of the pulpotomy treatment.¹⁶ But root canal therapy is also incredibly difficult and technically demanding. Numerous studies have shown that root-filled teeth have a high percentage of apical periodontitis (45%) and a high prevalence of poor-grade obturation (25–62%).

In permanent teeth with irreversible pulpal inflammation, many researchers are focusing on coronal pulpotomy as an alternative to root canal therapy because of the introduction of bioactive materials, a new understanding of pulp regeneration and vascularization, and technological advancements.^{17,18} Numerous investigations on coronal pulpotomy in permanent teeth with pulpal disorders indicate a success rate that is similar to that of root canal therapy.¹⁹ Therefore, pulpectomy treatment can effectively control pain and remove infected pulp with fewer risks of root canal offset and perforation and a shorter treatment period that is easy for patients to accept. This is made possible by the use of the current anesthesia technique and root canal measuring instrument.²⁰

CONCLUSION:

According to the study's constraints, pulpectomy was most frequently done on posterior teeth and was more common in children between the ages of 6 and 9 who needed pulp treatment.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil

CONFLICTS OF INTEREST

There are no conflicts of interest

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