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Original Research

Prevalence and etiology of anterior teeth pulpectomy in children under 6 years of age – A retrospective study

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ABSTRACT

Background

When there is significant caries or trauma to the maxillary anterior teeth, pulp therapy procedures are frequently recommended as the best-case selection for the child's overall health.

Aim

To study the prevalence and etiology of anterior teeth pulpectomy in children less than 6 years of age

Materials and methods

The data of children who had undergone pulpectomy were retrieved from dental OPD information retrieved from the Department of Pedodontics Archiving Software between March 2021 to March 2023

Results

In this study, 22.34% of patients who underwent anterior pulpectomy were 3 years of age, 40.60% of patients were 4 years of age and 37.06% of patients were 5 years of age. 87.06% of anterior pulpectomy was done in the upper anterior. 57.89% of patients who had undergone anterior pulpectomy were males and 42.11% were females. The prevalence of anterior pulpectomy was more in males than females. The most common cause of anterior pulpectomy was trauma, with a prevalence of 58.6% followed by caries, with a prevalence of 41.4%.

Conclusion

Children 4 and older had the highest frequency of anterior tooth pulpectomies. Compared to lower anterior teeth, children's upper anterior teeth had seen more pulpectomies. Compared to females, male children underwent more pulpectomies on their anterior teeth. Among both age groups, trauma was found to be the most frequent cause of anterior teeth pulpectomy, followed by dental caries.

Keywords: *Pulpectomy, prevalence, trauma to anterior teeth.*

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INTRODUCTION

The human race has faced dental caries since the beginning of time. Changes carried on by regular receptive processes, variations in pulp response, and variations in pulp anatomy all contribute to several problems when managing very young dentition[1]. The existence of bacteria within the affected tooth is the primary cause of pulp and periapical lesions[2]. Nevertheless, the pulpal tissue may also be impacted by several additional factors. Over the past few decades, attempts have been made to achieve some degree of success in pediatric endodontics, thanks to advancements in technology, materials, and instruments[3].

Due to severe caries or trauma, pulp treatment, such as pulpectomy or pulpotomy, is frequently recommended for maxillary primary anteriors[4]. Primary molars have been the subject of several prior studies assessing pulpotomies, pulpectomies, and indirect pulp treatment. Formocresol pulpotomies have been the focus of most previous research on primary molars[5]. Additionally, there is not much research that deals with anterior primary teeth. When physical or microbial agents have damaged the dentin that surrounds the tooth pulp, direct communication with the pulp and its surroundings takes place, exposing the pulp[6]. The main objectives of pulpectomy are the conservation of the tooth structure in a healthy functioning state, as an integral component of the dentition, preservation of the arch space, improved aesthetics and mastication, aid in oral hygiene maintenance, protection of erupting permanent teeth, and the periapical tissues[7].

The entire removal of the necrotic pulp from primary teeth's root canals and their filling with an inert, resorbable material to keep the tooth in the dental arch is known as a pulpectomy, according to Mathewson[8]. While pulpectomy refers to the complete removal of pulp tissue from root canals, this is not possible in primary dentition due to the intricate and irregular nature of the canals, accessory canals, constant resorption, and inability to identify an anatomical apex. Consequently, pulpectomy should be referred to as pulp canal treatment[9]. For the process of apexogenesis to continue in a young permanent tooth with an immature root, the dental pulp is crucial. Long-term retention of permanent teeth requires robust dentinal walls and an optimal crown/root ratio to support normal function[10]. Thus, the main objective of treatment for juvenile permanent dentition is pulp preservation. To limit the danger of pulp exposure and achieve partial caries eradication, it has been suggested that minimally invasive biologically based treatment options be promoted[11]. Strategies for pulp therapy can involve multiple visits utilizing a stepwise approach, or a single visit as an indirect pulp treatment. The avoidance of pulpectomy and the resurgence of essential pulp treatments, such as partial and total pulpotomy, are also altering treatment approaches for cariously exposed pulp[12].

The vast knowledge and research experience of our team has led to publications of excellent quality. This study established the frequency of anterior pulpectomies in children, the rationale behind them, and the relationship between age and gender.

MATERIALS AND METHODS

This study was conducted in a university setting using a retrospective cross-sectional design. Some advantages of the study setting were lower costs and more flexibility in data gathering. Nevertheless, due to its spatial restrictions and unicentric nature, it has minimal drawbacks. The Institutional Review Board granted ethical approval for the current investigation. From the case sheets, information about patients who underwent pulpectomies on their anterior teeth was taken. The necessary information was gathered and examined between September 2019 and March 2021. Patients with anterior pulpectomies in the age range of three to five years were the study's inclusion criteria. There were 1128

participants in the study. The insufficient information violated the exclusion criteria and was not included in the study

The necessary data such as age, gender, tooth number, and the causes of pulpectomies were collected, tabulated, and cross-verified by the analyzer. The tabulated data from the excel sheet was imported to SPSS version 23.0 for statistical analysis. The data was represented using mean and standard deviation in bar graphs to assess the prevalence and causes of anterior pulpectomies and correlation analysis to assess its association with age and gender.

RESULTS

In this study, 22.34% of children were 3 years of age, 40.60% of children were 4 years of age and 37.06% of children were 5 years of age (Figure 1). Among the total number of patients who had undergone anterior pulpectomies, 57.89% were males and 42.11% were females (Figure 2). For 87.06% of patients, pulpectomies were done in the upper anterior whereas for 12.94% of patients, pulpectomies were done in the lower anterior (Figure 3). The most common cause of anterior pulpectomy was Trauma, with a prevalence of 58.6% followed by caries, with a prevalence of 41.4% (Figure 4). At 3 years of age, 22.78% of patients had upper anterior pulpectomy and 1.51% had lower anterior pulpectomy. At 4 years of age, 31.83% had upper anterior pulpectomy and 8.87% had lower anterior pulpectomy, and at 5 years of age, 32.45% had upper anterior pulpectomy and 2.57% had lower anterior pulpectomy ($p = 0.00$, p-value < 0.05). The association between the age of the patients and the teeth undergone pulpectomy was significant (Figure 5). Males had a higher prevalence of anterior pulpectomies than females. Among 57.89% of males, 50.09% had upper anterior pulpectomy and 7.80% had lower anterior pulpectomies. 36.97% of female patients had upper anterior pulpectomies and 5.14% of them had lower anterior pulpectomies (Figure 6). Trauma was the most common cause of anterior pulpectomy among all ages. Among 3-year-old patients,14.18% of patients had a history of trauma and 10.11% had dental caries. Among 4-year-old patients, 24.38% of them had a history of trauma and 16.31% of them had dental caries. Among 5-year-old patients, 20.04% had a history of trauma and 14.98% had dental caries. However, the association between causes of pulpectomy and the age of the patients was not significant (Figure 7)

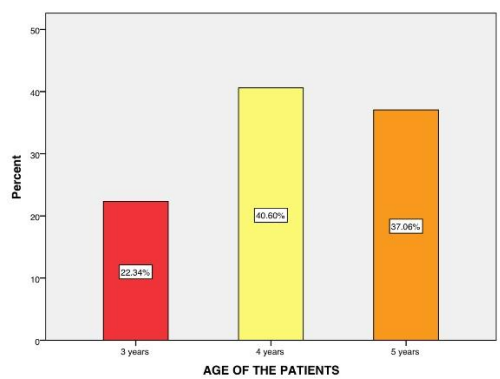

Figure 1: Bar graph showing the Age group of patients who had undergone anterior pulpectomy. The x-axis represents the age group and the Y-axis represents the percentage of children. 22.34% of patients were 3 years of age, 40.60% of patients were 4 years of age and 37.06% of patients were 5 years of age. Anterior pulpectomies were mostly performed among 4-year-old patients.

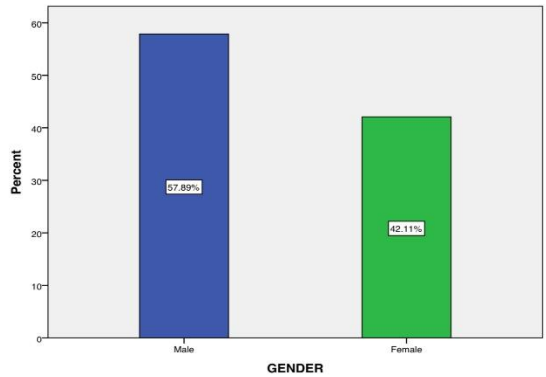

Figure 2: Bar graph showing the gender percentage of patients taken for the research. The X-axis represents the gender and the Y-axis represents the percentage of patients. 57.89% of patients were males and 42.11% of patients were females. Males had a higher percentage of anterior pulpectomies than females.

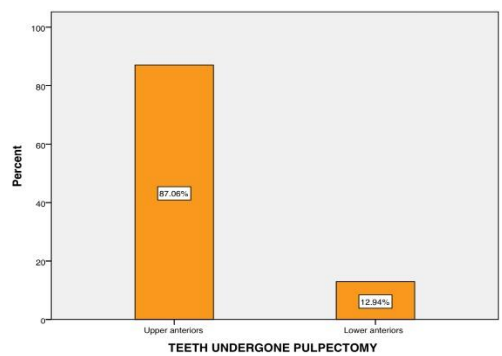

Figure 3: Bar graph showing the percentage of pulpectomy done in the upper and lower anterior. The X-axis represents the teeth undergone pulpectomy and the Y-axis represents the percentage of patients. 87.06% of patients had upper anterior pulpectomy and 12.94% of patients had lower anterior pulpectomy. The prevalence of pulpectomies was higher in the upper anteriors than lower anterior teeth.

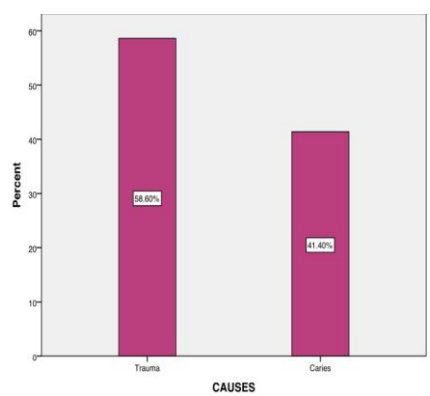

Figure 4: Bar graph showing the prevalence of pulpectomy due to different causes. The X axis represents the causes of pulpectomy and the Y axis represents the percentage of patients. 58.6% of patients had a history of trauma and 41.4% had Dental caries. Trauma was the most common cause of anterior pulpectomy.

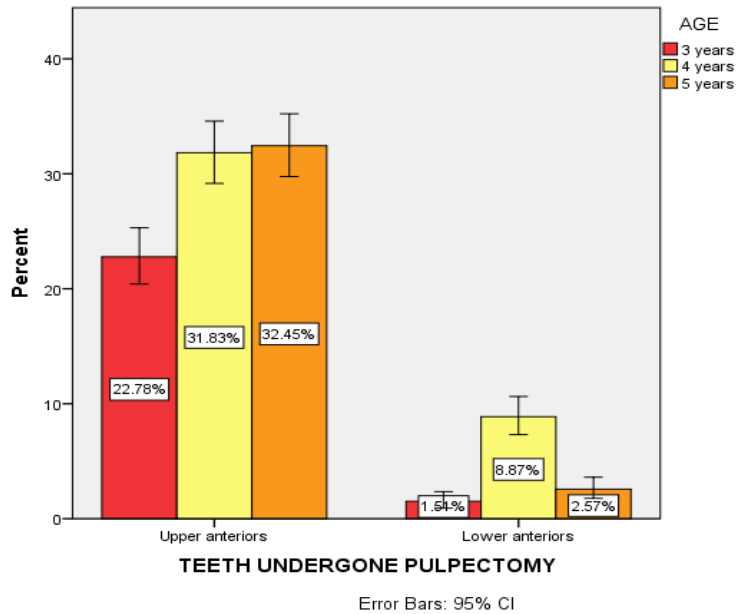

Figure 5: Bar graph showing the association between the age of the patients and teeth undergone a pulpectomy. The x axis represents the teeth that have undergone pulpectomy and the Y axis represents the number of children. At 3 years of age, 22.78% of patients had upper anterior pulpectomy and 1.51% had lower anterior pulpectomy. At 4 years of age, 31.83% had upper anterior pulpectomy and 8.87% had lower anterior pulpectomy, and at 5 years of age, 32.45% had upper anterior pulpectomy and 2.57% had lower anterior pulpectomy (p = 0.00, p-value < 0.05, statistically significant).

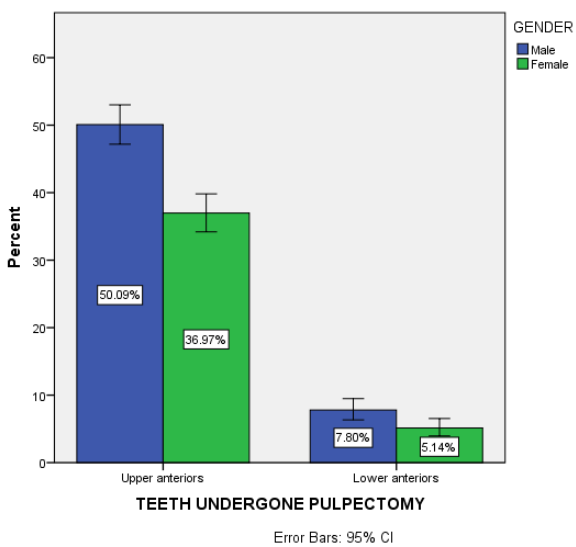

Figure 6: Bar graph showing the association between gender of the patients and teeth undergone Pulpectomy. The x axis represents the teeth that have undergone pulpectomy and the Y axis represents the number of children. Among males, 50.09% of them had undergone upper anterior pulpectomy and 7.8% had undergone lower anterior pulpectomy. Among females, 36.97% of them had undergone upper anterior pulpectomy and 5.14% of them had undergone lower anterior pulpectomy. (p = 0.297, p value > 0.05, not significant).

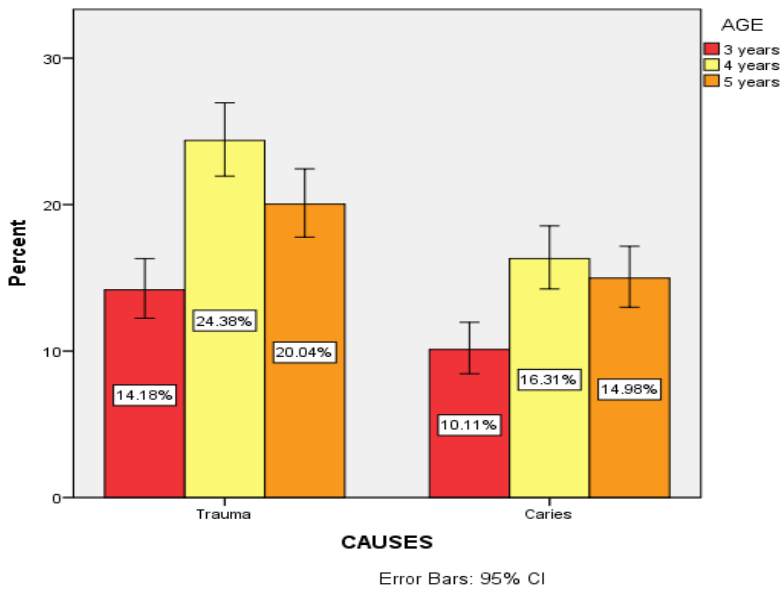

Figure 7: Bar graph showing the association between the Age of the patients and the causes of anterior pulpectomy. The x axis represents the causes of anterior pulpectomy and the Y axis represents the number of patients. Among 3-year-old patients,14.18% of patients had a history of trauma and 10.11% had dental caries. Among 4-year-old patients, 24.38% of them had a history of trauma and 16.31% of them had dental caries. Among 5-year-old patients, 20.04% had a history of trauma and 14.98% had dental caries .(p-value>0.05, not significant).

DISCUSSION

Pediatric endodontics can be challenging and time-consuming, particularly during the crucial biomechanical preparation phase of root canal therapy[13]. The vast majority of pulpectomies performed in this study were on children's primary teeth who were 4 years old. It was discovered that the most frequent reason for pulpectomy in anterior teeth was trauma. Early childhood trauma to the anterior teeth has occurred often and is still a concern for dentists, who must be prepared to diagnose and treat patients as needed[14]. It does not possess a substantial predicted pattern of strength or extensiveness, nor does it have a foreseeable technique of arising. It was discovered that there was a statistically significant correlation between age, aetiology, and teeth that had pulpectomy. Excessive mobility or symptoms of significant internal or exterior root resorption were considered contraindications for a pulpectomy[15].

Clinical or radiographic evidence of pulpal necrosis was used to make the diagnosis and choose which patients would have pulpectomies[16]. In cases of copious hemorrhage—uncontrollable bleeding that occurs after entrance into the pulp chamber following an access opening—pulpectomy is also recommended[17]. Because their morphological and physiological characteristics differ, deciduous teeth are more prone to caries. because the permanent tooth germ's closeness to the deciduous tooth renders it fragile, making endodontic therapy necessary to preserve it[18]. The best-case selection, which takes into account the child's general health and behaviour, the parents' motivation, the mouth's cariogenicity, and the case's follow-up, determines the prognosis of pulp therapy. The pedodontist needs to keep in mind that the tooth is the best space maintainer and the pulp is the best filling material because maintaining caries-prone deciduous teeth is a major challenge[19]. Consequently, by being knowledgeable of the various materials and techniques used in pulp therapy, a young child's deciduous tooth could be saved from extraction without having an impact on the child's general health or permanent dentition.

The study is simple and has the potential to expand the sample size. Some of the patients may have no symptoms and remain undiagnosed. Because the study is taking place at a hospital, there are geographical restrictions as well. Studying the occurrence of pulpectomies, however, presented several challenges, including inconsistent judgments, research bias, and clinicians with varying degrees of training, experience, and expertise. Another problem that arises when estimating the total prevalence of anterior pulpectomy in a community is the lack of clarity on the distinction between disease and non-disease.

More patients from a variety of ethnic backgrounds in the sample might improve the study's outcomes. Additional long-term epidemiological research would aid in accumulating crucial data and further validating the results. When performing a comprehensive clinical examination of a patient, it is important to take into account the importance of pulpal assessment, particularly for children and adolescents. Adequate sample size is necessary for reliable assessment of anterior pulpectomy the incidence, causes, and associated factors in future pulpectomies investigations.

CONCLUSION

Within the parameters of this investigation, we can say that patients 4 years of age and older had the highest prevalence of anterior pulpectomy. Compared to lower anterior teeth, a higher proportion of patients had pulpectomies in their upper anterior teeth. Compared to females, anterior pulpectomies were more common in males. In both age categories, trauma was shown to be the most frequent cause of anterior pulpectomy, followed by dental caries. In light of the ever-changing landscape of international sports and the marked rise in violence in our society, dental professionals have enormous challenges in managing dental trauma and tooth trauma.

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Nil

CONFLICTS OF INTEREST

There are no conflicts of interest

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