

A Comparative Analysis of Pulpectomy Procedures Utilizing Two Distinct Obturation Techniques the Navitip Method Versus the Disposable Syringe Technique To Evaluate the Effectiveness and Outcomes and Their Influence on Children's Behavioral Responses: An Original Research Study

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Abstract

Aim: This study aims to analyze the pulpectomy procedures utilizing two distinct obturation techniques: the NaviTip method versus the disposable syringe technique, to evaluate the effectiveness and outcomes and their influence on children's behavioral responses.

Materials and Methods: This study examines the efficacy of two obturation techniques used in pulpectomy for primary molars in paediatric patients aged 4 to 14 years, involving 40 participants (20 males and 20 females). Patients presented with issues like pain and swelling due to severely decayed maxillary primary molars, necessitating pulpectomy. Standard endodontic techniques, along with irrigation using normal saline and sodium hypochlorite, were employed to disinfect the canal. Teeth were then randomized into two groups: one used the NaviTip technique with zinc oxide eugenol for precise delivery, and the other used a modified disposable syringe for controlled expression of the material. Postoperative radiographs evaluated the quality of the obturation, checking for optimal fill conditions and any voids.

Statistical Analysis and Results: The patients were assigned to two groups: Group 1 used the NaviTip technique, while Group 2 employed a conventional syringe method. Results indicated that in Group 1, 40% of cases were underfilled, 50% achieved optimal filling, and 10% were overfilled. In Group 2, underfilling occurred in 20% of cases, 70% were optimally filled, and 10% were overfilled, showing better overall outcomes for the conventional method. Analysis of voids in the obturation material showed 10% in Group 1 and 30% in Group 2, highlighting a higher risk of voids with the syringe method. A one-way ANOVA further revealed significant differences in treatment outcomes between the two techniques. This study provides valuable insights for improving pulpectomy practices in paediatric dentistry.

Conclusion: The study concluded that the NaviTip technique was superior, reducing air spaces in the filling material for a better seal, leading to higher success rates. Additionally, children responded more positively when the NaviTip method was used, indicating it enhances both clinical outcomes and patient comfort.

Keywords: Pulpectomy, Obturation, Navitip Method, Disposable Syringe Technique, Children's Behavioral

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Introduction

A pulpectomy is a specialized dental procedure aimed at preserving an infected or compromised primary (baby) tooth by meticulously removing the infected pulp tissue from both the crown and the root canals. This procedure is crucial in preventing the premature extraction of the tooth, which can have lasting effects on a child's oral development.

The process begins with the careful administration of local anaesthesia around the affected tooth to ensure that the child remains comfortable and pain-free throughout the treatment. Once the area is sufficiently numb, a dental dam is placed around the tooth.^{1,2} This rubber-like barrier serves two essential purposes: it isolates the tooth being treated to maintain a clean and dry working

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environment and helps to prevent moisture contamination from saliva. Next, the dentist creates a small access hole in the tooth's crown to reach the pulp chamber. Using specialized endodontic instruments, the dentist navigates into the pulp chamber and the root canals, meticulously removing all infected or necrotic pulp tissue.^{3,4} This step is critical, as any remaining infected tissue could lead to further complications and require additional treatment. After the extraction of the pulp, the root canals undergo thorough cleaning and disinfection. This involves the use of various tools and irrigating solutions to eliminate any residual bacteria and debris.^{5,6} Ensuring that the canals are free from infection is vital for the success of the procedure. Following this, the dentist fills the cleaned root canals with a safe, resorbable medicated material, which is designed to facilitate healing and prevent reinfection. The access hole is then sealed with dental cement to protect the interior of the tooth. To safeguard the tooth until the permanent tooth emerges, a dental crown is typically placed over it.^{7,8} These crowns are often made of durable materials like stainless steel, providing added strength and protection to the compromised tooth. An advanced technique called the NaviTip technique can be incorporated during the pulpectomy to significantly enhance the filling process. This method involves using a flexible metal tip that connects to a syringe, allowing for precise injection of a resorbable filling paste deep into the cleaned root canals.^{9,10} The precision of this technique minimizes the risk of trapping air bubbles within the filling, ensuring a more uniform and effective sealing of the canals. In addition to the NaviTip technique, there is also a simpler and more cost-effective method for the filling phase that utilizes disposable syringes. For this approach, a standard medical syringe with a blunted needle is employed to efficiently inject a flowable root canal paste, such as zinc oxide-eugenol or a mixture of calcium hydroxide and iodoform, into the cleaned root canals.^{11,12} These advanced and simplified delivery techniques not only streamline the entire pulpectomy process, reducing the overall time spent during the obturation phase, but they also yield positive behavioural responses in paediatric patients during dental visits. Shorter treatment times help to minimize fatigue and anxiety, significantly lowering the chances of negative reactions such as crying or restlessness. Furthermore, utilizing simpler syringe systems can reduce mechanical noise and abrupt movements, which greatly enhances the comfort and calmness perceived by the child throughout the treatment. Overall, the successful execution of a pulpectomy ensures the long-term health of a child's primary teeth, contributing positively to their dental and emotional well-being.¹³ This study aims to analyze the pulpectomy procedures utilizing two distinct

obturation techniques: the Navitip method versus the disposable syringe technique, to evaluate the effectiveness and outcomes and their influence on children's behavioral responses.

Materials and Methods

This study meticulously investigates the efficacy of two distinct obturation techniques employed during pulpectomy procedures in primary molars among paediatric patients aged 4 to 14 years. A total of 40 young patients, consisting of an equal mix of male and female participants, were recruited. These patients presented with significant dental issues, including spontaneous or persistent pain, localized swelling, and severely decayed maxillary primary molars, which necessitated intervention through pulpectomy. Before undergoing the procedures, every patient was subjected to comprehensive clinical evaluations in accordance with rigorously defined inclusion and exclusion criteria. Ultimately, the 40 patients were evenly divided into two treatment groups, each comprising 20 individuals. One group utilized the NaviTip technique for obturation, while the other employed a disposable syringe technique. The specific inclusion criteria for participation in the study included children who demonstrated cooperation during dental procedures, as well as having primary teeth diagnosed with irreversible pulpitis. Additionally, it was essential that the patients had sufficient remaining root structure to support the pulpectomy treatment effectively. In contrast, patients were excluded from the study if they had severe systemic health issues, exhibited uncooperative behaviour, presented with significant root resorption, or had teeth classified as non-restorable. Conducting the pulpectomy involved a series of meticulous steps to prioritize patient comfort and the treatment's success. Initially, local anaesthesia was administered to minimize discomfort, ensuring that the patient remained as relaxed as possible during the procedure. Once the anaesthesia took effect, the affected tooth was isolated using a rubber dam to maintain a dry operating field, facilitating enhanced visualization and access to the tooth. Following isolation, the root canal was prepared using standard endodontic instrumentation techniques. This process was complemented by appropriate irrigation solutions, specifically normal saline and a concentrated solution of 5.25% sodium hypochlorite, to achieve effective disinfection of the canal system. After cleaning and shaping the canal, the prepared teeth were randomized into one of the two groups for obturation. In the NaviTip technique, a specially formulated mixed paste of zinc oxide eugenol was carefully loaded into a syringe, which allowed for precise delivery of the material into the canal space. This method was designed to ensure that the obturation material filled the canal homogeneously. On the other hand, the disposable syringe technique utilized a

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modified syringe that was back-loaded, enabling controlled and deliberate expression of the obturation material into the canal space. Once the obturation process was completed, immediate postoperative radiographs were taken to evaluate the quality of the fill within the canals. These radiographs were crucial for assessing various fill conditions, which were then categorized as optimal, underfilled, or overfilled. Additionally, the evaluation included checking for the presence of voids or gaps within the root canal system, which could compromise the treatment outcome. Ultimately, this study was to analyze and compare the clinical outcomes and quality of the two different obturation techniques. Furthermore, it seeks to evaluate how each method influences the behavioural responses of children undergoing pulpectomy procedures. The findings will provide valuable insights and contribute to the establishment of best practices for paediatric endodontic treatment, ensuring better care for young patients in the future.

Statistical Analysis

In this study, all statistical analyses were conducted using SPSS version 31.0, a robust software application that is widely utilised for statistical computing and data analysis, particularly within the social sciences. The analyses primarily employed the chi-square test, a statistical method known for its effectiveness in assessing differences in proportions among various groups. This test allows researchers to determine whether there are significant associations between categorical variables by comparing observed frequencies with expected frequencies. By utilising this approach, we aimed to gain deeper insights into the patterns and relationships present within the data collected for the study.

Results

This study conducts an in-depth examination of the effectiveness of two distinct obturation techniques utilized in pulpectomy treatments within a targeted sample of 40 paediatric patients, ranging in age from 4 to 14 years. The sample population consisted of an equal number of male and female participants, all presenting with severely decayed primary maxillary molars and seeking treatment through the pulpectomy process. To ensure a robust comparison, the 40 patients were systematically assigned into two separate treatment groups, each comprising 20 individuals. Group 1 was treated using the NaviTip technique for obturation, a method that utilizes a specialized delivery system intended to enhance the precision and efficiency of filling. In contrast, Group 2 underwent the conventional method of obturation, executed via a standard disposable syringe technique, which is traditionally used in clinical practice for such procedures. The results of this study, meticulously outlined in Table 1, reflect a carefully structured

approach to research design, with each group defined by specific pre-set criteria that aligned with the overarching objectives of the investigation. In Group 1, detailed in Table 2, the assessment outcomes indicated noteworthy results: of the 20 patients who received pulpectomy and obturation with the NaviTip method, the analysis highlighted that 8 cases (40%) were categorized as underfilled, 10 cases (50%) achieved optimal filling, and 2 cases (10%) resulted in overfilling. These findings underscore a significant variability in the quality of the obturation achieved with this method. Conversely, Table 3 provides insights into the results for Group 2, where patients treated with the disposable syringe technique were evaluated. The statistical outcomes from this group revealed a more favourable performance, with a lower rate of underfilling at 5 cases (20%), a notably higher rate of optimal filling at 14 cases (70%), and only 1 case (10%) exhibiting overfilling. This indicates a more consistent efficacy of the conventional syringe method in achieving the desired obturation quality. Further scrutiny was directed towards the presence of voids within the obturation materials, as voids can significantly compromise the integrity of the treatment outcome. In Group 1, as detailed in Table 4, analysis revealed that 2 cases (10%) demonstrated the presence of voids, while 18 cases (90%) were void-free, suggesting a high level of obturation quality with minimal defects. In stark contrast, the outcomes for Group 2, illustrated in Table 5, indicated a concerning trend, with 6 cases (30%) showing voids, while 14 cases (70%) exhibited no voids. This result points to a higher incidence of void formation risk associated with the disposable syringe method when compared to the NaviTip technique. Finally, Table 6 encapsulates the comparative analysis among all evaluated groups through a one-way ANOVA, providing essential statistical insights into the effectiveness of the two obturation techniques. The overall findings reveal significant differences in the quality of treatment outcomes between the two methods, contributing valuable data to the field of paediatric dentistry and offering implications for future clinical practice in pulpectomy treatments. This comprehensive examination enhances our understanding of the strengths and limitations inherent in each obturation technique, ultimately guiding clinicians towards improved treatment strategies for paediatric patients.

Table 1: The study has been categorized into two distinct groups, each defined by specific criteria that reflect the focus and objectives of the research

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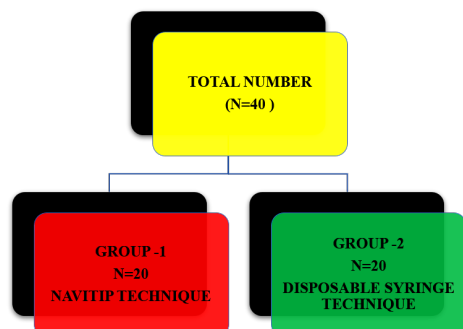


Table 2: Group 1 (n=20) Patients underwent pulpectomy treatment and obturation using the Navitip method. The quality of the obturation was assessed, and statistical analysis was performed

Parameters	Stat. Mean percentage	Std. Dev.	Std. Error	95% CI	Pearson Chi-Square Value	df	p value
Underfilling	8(40%)	0.999	0.060	1.665	1.052	1.0	0.02*
Optimal filling	10(50%)	0.089	0.054	1.188	1.029	1.0	0.089
Overfilling	2(10%)	0.098	0.052	1.166	1.019	1.0	0.16
*p<0.05 significant							

Table 3: Group 2 (n=20) Patients underwent pulpectomy treatment and obturation using the disposable syringe method. The quality of the obturation was assessed, and statistical analysis was performed

Parameters	Stat. Mean percentage	Std. Dev.	Std. Error	95% CI	Pearson Chi-Square Value	df	p value
Underfilling	5(20%)	0.097	0.048	1.143	1.14	1.0	0.17
Opti	14(70%)	0.0	0.0	1.0	1.0	0	0.0

mal filling	0%	0.92	0.053	2.8	5.5	0.9
Overfilling	1(10%)	0.088	0.082	1.22	1.023	0.23
*p<0.05 significant						

Table 4: Group 1 (n=20) Patients underwent pulpectomy treatment and obturation using the Navitip method. The presence and absence of voids was assessed, and statistical analysis was performed

Parameters	Stat. Mean percentage	Std. Dev.	Std. Error	95% CI	Pearson Chi-Square Value	df	p value
Presence	2(10%)	0.068	0.034	1.39	1.71	0.01	0.03*
Absence	18(90%)	0.072	0.043	1.45	1.62	1.0	0.18
*p<0.05 significant							

Table 5: Group 2 (n=20) Patients underwent pulpectomy treatment and obturation using the disposable syringe method. The presence and absence of voids was assessed, and statistical analysis was performed

Parameters	Stat. Mean percentage	Std. Dev.	Std. Error	95% CI	Pearson Chi-Square Value	df	p value
Presence	2(10%)	0.068	0.034	1.39	1.71	0.01	0.03*
Absence	18(90%)	0.072	0.043	1.45	1.62	1.0	0.18

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					e V a l u e		
Pr e s e n c e	6(35%)	0.47	0.028	1.29	1.61	1.09	0
A b s e n c e	14(75%)	0.092	0.067	1.38	1.45	0.64	0
*p<0.05 significant							

Table 6: Estimation amongst all studied groups using one-way ANOVA

Variable s	Degree of Freedom	Sum of Squares Σ	Mean Sum of Squares $m\Sigma$	F	Level of Sig. (p)
Between Groups	16	2.782	3.823	1.4	0.01*
Within Groups	22	3.832	2.045		—
Cumulative	562.43	80.271	*p<0.05 significant		

Discussion

Boutsiouki C et al reviewed in their study that a pulpectomy is a specialized dental procedure designed particularly for paediatric patients. Its primary objective is to eliminate infected or necrotic pulp tissue from both the crown and the root canals of primary (baby) teeth. Commonly referred to as a "baby root canal," this procedure is performed by paediatric dentists or endodontists when children present with severe toothaches, advanced decay, or infections that compromise the health of their primary teeth. Preserving the integrity of these baby teeth is vital, as they play a critical role in the development of the child's chewing function and ensure adequate spacing for the proper eruption of permanent teeth.^{14,15} Moudgalya MS et al reported in their study that the pulpectomy procedure is typically completed in a single office visit and consists of several methodical steps. Initially, the dentist uses a topical aesthetic gel to numb the area around the affected tooth, followed by the administration of a local aesthetic to ensure complete comfort during the procedure. For particularly anxious children, additional sedation options, such as nitrous oxide (commonly known as laughing gas), may be offered to alleviate their anxiety and help them relax throughout the treatment.^{16,17} Vitali FC et al reported in their study that once the area is appropriately numbed, a dental dam is placed over the tooth being treated. This small rubber cloth

isolates the tooth from the surrounding environment, preventing saliva and bacteria from contaminating the workspace, which is essential for maintaining a dry and clean area during the procedure. After isolation, the dentist carefully drills into the crown of the tooth to access the pulp chamber.^{18,19} Farhadian A et al reported in their study that this step involves removing the outer decayed portion of the tooth, allowing for a clear view of the underlying infected pulp tissue. Utilizing specialized instruments known as dental files, the dentist meticulously cleans out all infected and necrotic pulp tissue from the root canals. These files come in various sizes and shapes, enabling the dentist to navigate the intricacies of the canal systems effectively. Following the cleaning process, the root canals undergo disinfection and thorough rinsing with antibacterial solutions, aimed at eliminating any remaining bacteria and debris that could impede healing or lead to further complications. Once the canals are clean and disinfected, they are filled with a biocompatible, resorbable therapeutic paste, such as Zinc Oxide Eugenol or iodoform paste.^{20,21} Subramanian A et al included in their study that this type of filling is advantageous as it safely dissolves as the roots of the baby tooth are gradually absorbed over time, allowing for natural tooth resorption. To finalize the procedure, the access hole created in the crown is sealed with dental cement to prevent contamination and protect the interior of the tooth. Additionally, to strengthen the overall structure of the tooth and safeguard it against fractures, a preformed stainless steel crown is typically placed over the tooth. This crown not only restores the tooth's function but also provides a durable solution until the permanent tooth is ready to erupt. Recent advancements in pulpectomy techniques, such as the NaviTip method, have further enhanced the procedure.^{22,23} Nagarathna C et al reported in their study that this innovative approach employs flexible delivery tips for precise irrigation and filling of the canals, leading to considerably improved outcomes when compared to traditional methods. Moreover, the Disposable Syringe Technique offers a straightforward and effective means of filling the root canals, serving as a reliable alternative to more complex devices. These modern techniques help streamline the pulpectomy process, significantly reducing chair time for young patients and minimizing anxiety. By utilizing smaller components that present a less intimidating appearance than traditional syringes, dentists can create a more comfortable and less stressful experience for children. The efficiency of these methods not only leads to shorter procedural times but also contributes to higher cooperation rates among pediatric patients and lower levels of distress, positively affecting their overall behaviour during dental visits.^{24,25}

Conclusion

In this study, the authors conducted a comparative analysis of pulpectomy procedures, focusing on two distinct obturation techniques: the NaviTip method and the disposable syringe technique. The primary objective was to evaluate the effectiveness and outcomes of each method, as well as their influence on children's behavioural responses during treatment. The research findings concluded that the NaviTip technique demonstrated notable superiority over the disposable syringe method. Specifically, it was more effective in minimising the presence of air spaces, or voids, within the filling material, which is crucial for achieving a proper seal. This better sealing capability translated to improved success rates in treatment outcomes. Additionally, the study found that children exhibited more positive behavioural responses when the NaviTip method was utilized, suggesting that this technique not only enhances clinical effectiveness but also contributes to a more comfortable experience for young patients during pulpectomy procedures.

References

- Chawla S, Singhal R, Namdev R, Kumar A, Chhanna K, Kumari C. Effectiveness of pulpotomy compared with pulpectomy for irreversible pulpitis in primary teeth: A systematic review and meta-analysis. *J Dent*. 2026;16(6):10-16.
- Mourão PS, Fernandes IB, Santos K, et al. Comparing the use of pediatric files and conventional files in primary teeth: a systematic review. *Eur Arch Paediatr Dent*. 2026;27(2):293-318.
- Nisar P, Katge F, Chimata VK, Pradhan D, Patil D, Agrawal I. Comparative evaluation of hand and rotary file systems on dentinal microcrack formation during pulpectomy procedure in primary teeth: an in vitro study. *Eur Arch Paediatr Dent*. 2024;25(2):181-189.
- Campos PSS, Gois CMB, Serafim V, Puppini-Rontani RM, Pascon FM. Teaching pulpectomy in paediatric dentistry: A national cross-sectional survey of dental schools in Brazil. *Int J Paediatr Dent*. 2024;34(5):653-662.
- Bai JS, Dhull KS, Maiti N, Devraj IM, Bohidar S, Sharma S. Investigating Apically Extruded Debris During Pulpectomy with Two Rotary Systems and Hand Files. *J Pharm Bioallied Sci*. 2024;16(3):S2085-S2087.
- Bastos MC, Albuquerque FGA, Filho ELC, Silva PGB, Rolim JPML. Clinical and radiographic success of pulpotomy and pulpectomy in primary and permanent teeth: a Systematic Review and Meta-Analysis. *J Clin Exp Dent*. 2024;16(9):e1120-e1128.
- Chen Z, Li M, Chen Y, et al. Survival analysis of primary molars following pulpectomy performed under dental general anesthesia: a five-year retrospective study. *BMC Oral Health*. 2024;24(1):12-17.
- Dou G, Wang D, Zhang S, Ma W, Xu M, Xia B. A retrospective study on the long-term outcomes of pulpectomy and influencing factors in primary teeth. *J Dent Sci*. 2022;17(2):771-779.
- Ellana Jermiah J, Rao A, Srikant N, Rao A, Suprabha BS. Comparative Evaluation of Three Obturating Techniques in Primary Molars: An in Vivo Study. *J Clin Pediatr Dent*. 2019;43(6):372-375.
- Singh A, Anand S, Prakash R, Ahmed A, Dhawan J. A Comparative Analysis of Voids and Sealing Ability of Different Obturating Techniques Using CBCT. *J Contemp Dent Pract*. 2022;23(10):1021-1025.
- Subbaraj S, Chenchugopal M, Elangovan A, Jagadeesan A. In Vivo Comparative Evaluation of Four Different Obturation Techniques in Primary Teeth: A Randomized Controlled Clinical Trial. *Int J Clin Pediatr Dent*. 2025;18(11):1311-1317.
- Patil AP, Lakade L, Patil K, Shah P, Patil S, Davalbhakta R. Comparison of Antibacterial Efficacy of Conventional Root Canal Irrigation System and Metronidazole, with and without Pro-agitator Tip System, in Primary Anterior Teeth: An In Vivo Study. *Int J Clin Pediatr Dent*. 2025;18(8):911-916.
- Govindaraju L, Subramanian E, Jeevanandan G. Comparing the Influence of Conventional and Rotary Instrumentation Techniques on the Behavior of the Children: A Randomized Clinical Trial. *Int J Clin Pediatr Dent*. 2021;14(Suppl 2):S179-S185.
- Boutsiouki C, Frankenberger R, Krämer N. Clinical and radiographic success of (partial) pulpotomy and pulpectomy in primary teeth: A systematic review. *Eur J Paediatr Dent*. 2021;22(4):273-285.
- Najjar RS, Alamoudi NM, El-Housseiny AA, Al Tuwiriq AA, Sabbagh HJ. A comparison of calcium hydroxide/iodoform paste and zinc oxide eugenol as root filling materials for pulpectomy in primary teeth: A systematic review and meta-analysis. *Clin Exp Dent Res*. 2019;5(3):294-310.
- Moudgalya MS, Kulkarni P, Tiwari S, Mali S, Shrivastava AK, Shrivastava S. Flare-ups in Primary Teeth Before, During, and After Pulpectomy: A Systematic Review and Meta-analysis. *Int J Clin Pediatr Dent*. 2024;17(7):838-841.
- Saher T, Wilson B, Kuppusamy K, Mishra S, Chemblon SK, Dalal D. Comparing Oral Microbiota Changes after

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Pulpotomy/Pulpectomy in Pediatric Patients. J Pharm Bioallied Sci. 2024;16(Suppl 3):S2253-S2255.

18. Vitali FC, Kominami PAA, Andrada AC, Takeshita EM, Massignanc. impact of pulpectomy versus extraction of primary teeth on patient-centered outcomes: a systematic review of clinical studies. j Evid Based Dent Pract. 2025;25(1):12-17.
19. Gadallah LK, Elbardissy A, Elyazeed MA, Alsamad AA, Hamdy M. Pulpotomy versus pulpectomy in carious vital pulp exposure in primary incisors: a randomized controlled trial. BMC Oral Health. 2024;24(1):35-39.
20. Farhadian A, Issa MA, Kingsley K, Sullivan V. Analysis of Pediatric Pulpotomy, Pulpectomy, and Extractions in Primary Teeth Revealed No Significant Association with Subsequent Root Canal Therapy and Extractions in Permanent Teeth: A Retrospective Study. Pediatr Rep. 2024;16(2):438-450.
21. Memarpour M, Shahidi S, Meshki R. Comparison of different obturation techniques for primary molars by digital radiography. Pediatr Dent. 2013;35(3):236-240.
22. Subramanian A, Kannan VP, Santhakumar M. A Comparative Volumetric Evaluation of Three Different Obturation Techniques in Primary Teeth: An In Vitro Study. Int J Clin Pediatr Dent. 2025;18(7):856-863.
23. Guelmann M, McEachern M, Turner C. Pulpectomies in primary incisors using three delivery systems: an in vitro study. J Clin Pediatr Dent. 2004;28(4):323-326.
24. Nagarathna C, Vishwanathan S, Krishnamurthy NH, Bhat PK. Primary Molar Pulpectomy Using Two Different Obturation Techniques: A Clinical Study. Contemp Clin Dent. 2018 Apr-Jun;9(2):231-236.
25. Nellamakkada K, Patil SS, Kakanur M, Kumar RS, Thakur R. A clinical evaluation of two electronic apex locators and conventional radiography in working length determination in primary molar and its influence on children's behavioural responses. J Indian Soc Pedod Prev Dent. 2020;38(2):158-163.