



**Comparative Evaluation of the Rates of Postoperative Pain and Flare-Ups Following Single visit versus Multiple Visit Pulpectomy in Primary Molars**

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**ABSTRACT**

**Introduction**

Numerous short- and long-term issues can arise from endodontic treatment that is completed in a single visit or over the course of several visits. Postoperative discomfort and flare-ups are one of the immediate consequences. The capacity to foresee its occurrence and advise the patient may assist the dentist make judgements about pain management treatments and enable coping mechanisms.

**Aim**

To Examine the frequency and severity of postoperative discomfort and flare-ups after pulpectomy in primary molars between single- and various-visit procedures. Additionally, to link postoperative discomfort and flare-ups to the pulp's preoperative condition.

**Materials and Methods**

The study comprised 80 primary molars that had pulpectomy indications and split them into two groups. Preoperative pulp vitality status was reported for the tooth that underwent treatment. The entire pulpectomy process was carried out according to protocol. On the same visit as the pulpectomy for Group 1's teeth, the teeth were obturated. In the subsequent appointment, teeth in

Group 2 (multiple visit pulpectomy) were obturated. After 24 hours, 7 days, and 1 month, the postoperative discomfort, flare-ups, and medication use were recorded.

### **Results**

A 24 hour recall revealed postoperative pain in four individuals in both groups (10%;  $p=0.74$ ). Each group experienced one flare-up (2.5%;  $p=0.67$ ). At the seventh day and one month after recall, none of the patients complained of pain. Three important teeth (6.9%) and five non-vital teeth (13.5%) both reported post-operative pain. Statistically speaking, it was insignificant ( $p=0.53$ ).

### **Conclusion**

There was a relatively low incidence of postoperative discomfort from the standpoint of our investigation. Within 24 hours of treatment, the majority of patients in both groups reported no pain or very little pain. The incidence of postoperative discomfort did not differ between the single- and multi-visit therapy strategies. Pulp vitality and the likelihood of postoperative discomfort have no discernible relationship.

Keywords: Dental pulp, Pain, Primary tooth, Root canal therapy, single visit Pulpectomy and multi visit pulpectomy

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## **INTRODUCTION:**

The most crucial component of preventative dentistry is maintaining the integrity of the primary dentition. In order to preserve arch length and ensure that the temporal and spatial development of permanent teeth is coordinated, it is beneficial to keep the primary teeth in place until they naturally exfoliate. (1) Early tooth loss can cause cosmetic, masticatory, speech, and malocclusion issues. The most frequent causes of pulpal invasion requiring endodontic therapy are cavities and dental trauma (2). Traditionally, numerous visits were required for root canal therapy. Between sessions, intracanal medications were utilized to lessen or get rid of microorganisms from the root canal system. Endodontic treatment requiring multiple visits is widely recognised as a routine and safe procedure (3).

Endodontic procedures being completed in a single visit are becoming more and more common in the present since they have less flare-ups, no chance of intra appointment leakage through temporary cement, and fewer surgical procedures and dental appointments (4).

To eliminate any leftover bacteria or to make them harmless by burying them with three-dimensional obturation is the goal of single visit endodontic treatment. Treatment that is completed in a single visit deprives the intracanal microorganisms of the nutrients they need to thrive and spread (5).

There are major differences in opinions regarding the dangers and advantages of single-versus multi-visit root canal therapy. Numerous short- and long-term issues can arise from endodontic treatment that is completed in a single visit or over the course of several visits. Postoperative discomfort and flare-ups are among the short-term consequences (6,7). In most cases, an immediate inflammatory reaction to a microbiological, physical, or chemical insult to the peri-

radicular tissues is what causes pain to develop after endodontic therapy. It starts shortly or a few days following endodontic therapy (8). Although root canal postoperative discomfort is not a reliable predictor of longevity. Patients' confidence in the clinician and attitudes towards endodontic treatment may be weakened by postoperative discomfort and flare-ups. Flare-ups and postoperative pain may even cause patients to distrust the clinician's abilities. It may help to some extent to enable coping mechanisms and aid dentists in pain management treatment selections if it is possible to foresee its prevalence and warn the patient. Numerous studies have linked dental anatomy, the number of visits required to complete endodontic treatment, the presence of preoperative pain, intracanal medication, and the state of the pulp to postoperative pain after root canal therapy in permanent teeth (7). Studies comparing the success rates of single-visit vs. multiple-visit pulpectomies and success with various obturating medications have been conducted on primary teeth. Postoperative discomfort following endodontic therapy for primary teeth, however, has not received much research (9). It is not possible to apply the conclusions from studies on permanent teeth to primary molars. The anatomy of primary teeth is distinct and Our team has extensive knowledge and research experience that has translated into high quality publications (10–19). The canals are thinner and flattened, and the roots, particularly those of the molars, are long and slender. Additionally, when primary teeth continue to develop secondary dentin, the root canal's morphology changes, leading to differences such as lateral branching, (20) connecting fibrils, apical ramification, and partial canal fusion (21). The current study aimed to associate the preoperative pulp state with postoperative pain and flare-ups by comparing the frequency and severity of postoperative pain and flare-ups after single- and multiple-visit pulpectomy in primary molars.

#### **MATERIALS AND METHODS:**

This was a parallel group for prospective randomised clinical research. The 12-month research was conducted at the Paediatric Dental Hospital in Chennai. The institutional review board granted ethical approval.

#### **Sample Size:**

Instances of post-obturation pain were reported by NG Y L et al. to be 27.2% in multiple visits and 58.2% in single visit root canals. Thus, using the formula, sample size was calculated with an expectation that the minimal proportional difference between the two procedures would be 30%, with the statistical significance of the study set at 80% (beta error at 20%), and alpha error at 5%.

For each group, a sample size of  $N = 40$  was required.

#### **Study Population:**

Children between the ages of five and eight who were cooperative and who had one primary molar that was recommended for pulpectomy (i.e., teeth with irreversible pulpitis and necrosis with limited root end resorption) were invited to take part in the investigation. To prevent pain

referral, patients with many teeth requiring pulpectomy were excluded from the trial. Based on their medical histories, all of the patients were in good health. To make sure patients hadn't taken antibiotics or analgesics before to therapy, a medical history was collected. The study excluded teeth having intraoral or extraoral swellings, as well as teeth with root end resorption of more than one third. Parents' informed written consent was acquired.

Patients were sequentially randomized to single-visit (Group I) or multiple-visit (Group II) therapies (simple randomization, where all patients with odd numbers received assignments to single-visit and all patients with even numbers were assigned to multiple-visit). The pulp vitality, presence, or lack of prior discomfort was never taken into consideration while deciding whether to use single- or multiple-visit treatment. Because of the initial disdain for pulp vitality and preoperative discomfort, it was impossible to classify uncomfortable, nonvital teeth into one therapy group. Eighty individuals were enrolled in the investigation after taking the inclusion and exclusion criteria into account [Fig-1].

### **Study Design:**

Both the tooth's location and health were noted. Nonvital teeth were defined as having no apparent bleeding at access opening . One operator completed all of the traditional steps of pulpectomy, including access opening, determining the working length of the root canal, and obturation. The root canals were mechanically prepared using H files coated with 15% EDTA+10% carbamide peroxide. To prevent over instrumentation, the filing was stopped 2 mm short of the radiographic root apex. 3% sodium hypochlorite was employed as an irrigation after instrumentation. In order to remove any remaining sodium hypochlorite before obturation, normal physiological saline was utilized as the final irrigant in the canals. Since even a small amount of sodium hypochlorite expulsion can cause inflammatory and soft tissue damage. On the same visit as the pulpectomy for Group 1's teeth, the teeth were obturated. In the subsequent appointment, teeth in Group 2 (multiple visit pulpectomy) were obturated. For teeth in Group II, formocresol was utilised as an intracanal medication. Both groups employed metapex as an obturating substance. To confirm that all teeth had been satisfactorily obturated, an post obturation radiograph was taken. Before leaving the dental office, the patient and parents were taught how to classify their pain. According to Oginni and Udoye's study, pain was classified as none, mild, moderate, or severe. No: The tooth after treatment felt natural. Patients reported no pain. Any anxiety, regardless of how fleeting, that does not require medicine and does not negatively affect the ability to chew. Pain that needs to be treated with medicine (NSAIDs) is moderate or severe. impairment of chewing function (chewing discomfort). Pain flare-ups that are not managed by NSAIDs or swelling, sinus, or pus drainage.

At the first, seventh, and thirty-first days following obturation, the patients were summoned back. Crowns made of stainless steel were used to restore teeth during the initial postobturation recall. At each postobturation recall visit, a single impartial assessor who was blind to the visit group under investigation spoke with and evaluated the patients. The evaluation

team decided if symptoms existed at the time of the visit or in the time between it and the one before it. At each recall visit, the presence, absence, or appropriate level of discomfort was noted. The interval between visits and the visit after were regarded as one postobturation phase. The level of pain for the particular postobturation period was reported as being the highest, either during the interval or at the subsequent visit. The chi-square test was used to analyse the gathered data. Statistical significance was defined as a p-value 0.05.

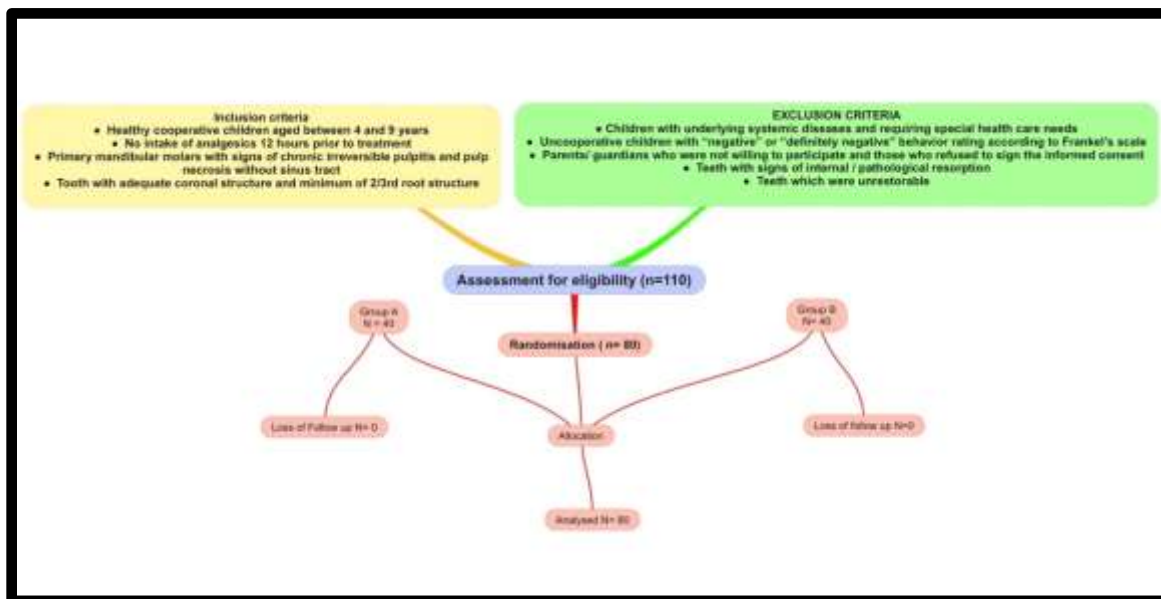


Figure 1: Represents Distribution of study population.

## RESULTS:

At 24 hours recall, there were four instances each in the two groups that reported postoperative pain (10%;  $p=0.74$ ; Table 1). In every group, one patient (2.5%), with a p-value of 0.67 [Table 2, Figure 2 and 3], reported an acute episode. The individuals in question complained of excruciating pain that NSAIDs were unable to manage. Antibiotics had to be prescribed by the doctor. They did not, however, display any sinus tracts or abscesses, and none of the patients complained of pain at the seven-day or one-month recall points. Three vital teeth (6.9%) and five non-vital molars (13.5%) both reported discomfort following an operation [Table 3]. Statistically speaking, it was insignificant ( $p=0.53$ ).

**Table 1 : Comparison of pain after obturation: Single and Multiple visit**

Group	Total No of teeth	None		Mild		Moderate/ Severe		Chi square value	P value
		n	%	n	%	n	%		
Single Visit	40	36	90	3	7.5	1	2.5	1.44	0.74
Multivisit	40	36	90	3	7.5	1	2.5		
Total	80	72	90	6	7.5	2	2.5		

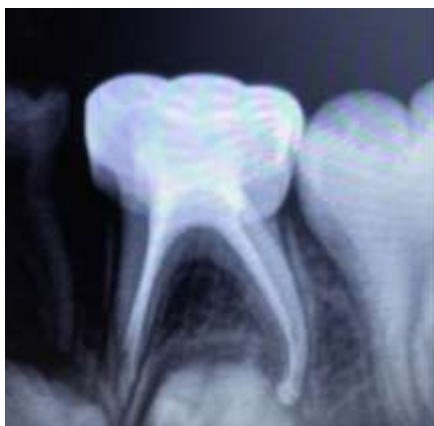
**Table 2: Incidence of post obturation flare-up**

Group	Total No of teeth	No Flare ups		Flare ups present		Chi Square value	P value
		n	%	n	%		
Single Visit	40	39	97.5	1	2.5	0.85	0.67
Multivisit	40	39	97.5	1	2.5		

**Figure 2: Incidence of post obturation flare-up**



**Figure 3: Incidence of post obturation flare-up**



**Table 3: Incidence of postoperative pain on the obturation day between Vital and non Vital**

Group	Total No of teeth	None		Mild		Moderate/ Severe		Chi square value	P value
		n	%	n	%	n	%		
Vital	43	40	93.02	2	4.65	1	2.23	0.68	0.53
Non - Vital	57	32	86.48	4	10.81	1	2.7		

## **DISCUSSION**

In the current study, the postoperative pain following a pulpectomy requiring a single visit was comparable to the postoperative discomfort following a therapy requiring numerous visits. Both groups experienced 10% postoperative discomfort incidence (22). The incidence of postoperative discomfort and the vitality of the pulp did not show an association that was statistically significant. One of the most frequent short-term consequences of endodontic therapy is immediate postoperative inflammation of the periradicular tissues accompanied by discomfort. Making judgements on pain management treatments can be aided by anticipating the occurrence of postoperative pain (23). Many physical and psychological variables influence how people perceive pain, which is very subjective (24). The level of pain or discomfort must be classified using exact terminology (for example, "slight pain" means any discomfort, no matter how brief, that did not require medicine and did not in any way affect masticatory function) (25). Therefore, to make the pain rating process simpler in our study, the amount of discomfort was classified as minimal, moderate, or severe pain. Before the study began, these three categories were clearly specified, educating patients on how to classify their pain experiences (26). In our investigation, the postoperative pain related to a pulpectomy requiring a single visit was comparable to the postoperatively pain related to a multiple visit course of treatment. Our findings are in line with the majority of previously published studies on this subject in permanent teeth (27). There was no distinction in the occurrence of postoperative pain among multi-visit and single-visit treatments, according to a systematic study by Wong AWY et al. Fewer research, nevertheless, have presented alternative viewpoints (28). In retreatment cases of permanent teeth, two visit treatments with intracanal medication may be more helpful in lowering postoperative pain and flare-up than a single visit, according to research by Yoldas O et al. In two visit cases, calcium hydroxide combined with chlorhexidine was administered as an intra-canal medication (29). Patients with problematic permanent teeth having retreatment served as the study's subjects. In teeth undergoing retreatment, *E. faecalis* and *Candida albicans* are frequently found in the root canals. *Candida albicans* and *E. faecalis* are both successfully eradicated by chlorhexidine. In multi-visit patients, this explains why there is less postoperative pain and flare-up (30). However, single-visit therapies reduce postoperative pain, according to research by Su Y et al. (meta-analysis) and Roane JB et al. The researchers claim that single visit treatment minimizes re-infection of the canals due to permeability after the temporary restoration by avoiding repeated chemical and physical stimulation to the periapical tissues from instruments and medications (31). The two groups experienced no post obturation pain at their seventh or thirty-first day. Two patients who experienced flare-ups only experienced significant pain that was unmanageable with ibuprofen alone, necessitating the doctor's prescription of amoxicillin. Not until the seventh post obturation day did pain continue (32). There was no obvious edema, nasal discharge, or pus. The frequency of post-endodontic discomfort is proven to steadily diminish over time by a systematic review by Pak JG et al. The first 24 to 48 hours are the most painful for patients, and their discomfort gradually lessens over the next seven days (33). These data imply that practitioners should refrain from overreacting to post-endodontic pain by starting retreatment



right away (34). It has been hypothesized that the condition of the pulp prior to endodontic therapy has a significant impact on how successful the procedure is. However, there was no statistically significant difference in our investigation between the discomfort experienced by teeth that were crucial and those that were not (35). This study challenges the traditional wisdom that only critical teeth should undergo single-visit endodontic treatment (36). Additionally, increased incidences of postoperative discomfort in nonvital teeth were documented by Albashaireh ZS and Alnegrish AS. Roane JB et al., Fava LRG, Eleazer PD et al., Ince B et al., Mulheren JM et al., however, support the findings of our study. In nonvital primary molars, Coll JA et al. showed 86.1% success with single visit pulpectomy. The canals were exposed to a paper tip moistened with Buckley's formocresol for five minutes. ZOE, a zinc oxide eugenol, was employed as the filling substance (37). Additionally, Singla R et al. found no appreciable difference in the primary molar pulpectomy success rate between single- and multiple-visit pulpectomy. Their research nevertheless failed to link pulp state prior to surgery to pulpectomy outcomes. Single visit endodontic therapy can successfully manage the intracanal microbiota and result in a successful treatment outcome when combined with excellent mechanical instruments, the use of antimicrobial irrigating solution, and adequate obturation (38). Incidence of discomfort following surgery in remaining teeth ranges from 3% to 58%. In our study, 10% of the primary molars in both groups experienced postoperative pain. Periapical disease in permanent teeth is a risk factor for postoperative discomfort (39). Preoperative pain and discomfort following surgery are closely related. In the present study, we did not connect the presence/absence/intensity of preoperative pain with postoperative pain, and we omitted the teeth that showed symptoms of dentoalveolar infection. These are most likely the causes of the low incidence of discomfort following surgery (40). When performed under sound biologic principles and with modern, scientifically based method, pulpectomy can be expected to have a low incidence of postoperative pain. To determine the impact of various equipment systems, obturating substances, irrigating solutions, and patient degree of cooperation during surgery on the occurrence of postoperative discomfort in primary teeth, additional research must be conducted. Identifying indicators of risk for post endodontic pain and episodes in primary teeth is also necessary.

#### **Limitations:**

The presumption that children's ratings of the pain are a reliable indicator of their pain perception can be a potential restriction of any study on pain. However, there is no other way to demonstrate that someone is in agony except to believe them.

The current study's failure to link the severity of preoperative and postoperative pain is another drawback. Additionally, the group receiving several visits did not record any post-instrumentation pain. The only pain after obturation was considered.

#### **CONCLUSION:**

According to our study, postoperative pain was not commonly experienced. At 24 hours recollection, more than half of the participants in both groups reported no discomfort or very

little pain. The incidence of postoperative discomfort did not differ between the single- and multi-visit therapy strategies. Pulp vitality and the likelihood of postoperative discomfort have no discernible relationship.

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