

CLINICAL AND RADIOGRAPHIC EVALUATION OF THE PULPECTOMY WITH AND WITHOUT OBTURATION IN PRIMARY MOLARS: A PROSPECTIVE STUDY

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ABSTRACT

Objectives: The objective of the present study was to evaluate the clinical and radiographic success of pulpectomy of primary molars with and without obturation.

Materials and Methods: Fifteen Paediatric patients in the age range of 7-9 years were included in split mouth study design and were divided into 2 groups. In group I, standard pulpectomy and group II pulpectomy without obturation was performed. The patients in both the groups were followed up for 6months. **Results:** Group I showed 100% radiographic success compared to 86.7% for group II over 1 year time period. **Conclusion:** Pulpectomy without obturation can be considered as an acceptable alternative to conventional pulpectomy, if root canal preparation and disinfection of the root canal is done under aseptic conditions.

KEY WORDS

Conventional Pulpectomy;
Pulpectomy without obturation;
Irreversible Pulpitis.

INTRODUCTION

In the era of technical advancements in dentistry, focus has been shifting towards evidence based dentistry practices. Early intervention and customise treatment plan for individual patients is the need of the hour. Pulpectomy of irreversibly inflamed primary teeth is required to maintain healthy oral environment and keep these teeth free of further infection. Factors under the control of the dentist are root canal preparation, disinfection and canal obturation. Relative importance of individual factors has been proven in the permanent dentition. Root canal preparation methods, canal disinfection and obturation techniques were evaluated in various studies. In recent years the stress has been put on the importance of coronal restoration and quality of root canal preparation irrespective of the obturation technique employed.

However, there is lack of published data on the coronal seal in primary teeth. The present study was planned with the aim to see the relative success of obturated and unobturated root canals in primary teeth with thorough root canal preparation and disinfection followed by Stainless Steel Crown. As root canal obturation materials used

for primary teeth never seal the apex of primary teeth and resorbs with the resorption of roots. Therefore, emphasis has never been laid down on the apical seal in primary teeth. Taking this into consideration present study was planned. Torabinejad¹ et al. 1990 and Khayat² et al. 1993, and Saunders WP, Saunders EP³ 1994, also emphasized the role of coronal restoration in the success of endodontic restorations. The technical quality of the coronal restoration was even more important for the periapical status than the quality of the endodontic treatment.⁽⁴⁾ Hence, the present study was planned to evaluate the clinical and radiographic success of pulpectomy with and without obturation in primary molars.

MATERIALS & METHODS

A total of 15 children in the age range of 7-9 years were taken for the study. Thirty primary molars with irreversible pulpitis and necrosis were selected from these patients. Using split mouth study design, they were divided into 2 groups. Conventional pulpectomy was performed with obturation in Group I and pulpectomy without obturation in Group II. The study was approved by Institutional Ethical Committee of Bhojia Dental College and Hospital, Baddi (BDC Letter No.10460) dated 12.11.2014

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Selection of Patients

The teeth indicated for single sitting pulpectomy were selected for the study. The inclusion criteria were the teeth with active caries involving the pulp, history of spontaneous pain or pulp necrosis, restorable crown structure and full complement of dentition. The teeth with irreversible pulpitis were taken and diagnosis was made based on the patient's history, clinical and radiographic findings. Another clinical parameter considered was profuse uncontrollable bleeding from pulp chamber after access cavity preparation, conclusive of irreversible pulpitis. The exclusion criteria were the teeth with fistula / sinus tract / peri-apical abscess, severe tenderness to percussion, abnormal mobility and non-restorable crown structure (figure 1). Children with known systemic disease, mental disability or abnormal para-functional habits were not included in the study.

Figure 1. Pre operative IOPA of Carious primary second molars 75 (a) & 85 (b)



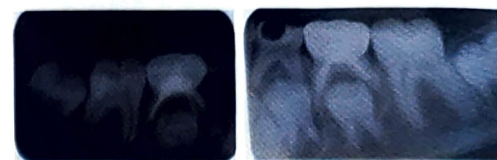
Clinical Procedure

An informed written consent of the parents was obtained. Single sitting pulpectomy was performed in both the groups. After induction of local anesthesia, the teeth were isolated with rubber dam. Disinfection protocol was followed in both the groups. The crown of the tooth and surrounding rubber dam was

disinfected by applying hydrogen peroxide (30%) for 30 seconds followed by tincture iodine (5%) for 1 minute and disinfectant was inactivated by sodium thiosulphate solution (5%) for one minute. Access opening was made using round carbide bur at high speed. The canals were located after de-roofing the pulp chamber. After obtaining patency of the canal, all accessible coronal and radicular pulp tissue was removed with broaches. After this, K-file No. 10 was used for determining working length by the conventional Ingle's radiographic method. The file was kept 1-2 mm short of the radiographic apex. The apical third was serially enlarged to and circumferential filing was done around the entire perimeter as per standard step back procedure. Cleaning and shaping of root canal was carried out by progressively increasing the diameter with simultaneous copious irrigation. During each step of instrumentation, canals were frequently irrigated with metrogyl and normal saline. Final irrigation was done with 17% EDTA and 3% NaOCl for smear layer removal.

In Group I, after removal of smear layer the canals were dried with absorbent paper points. Metapex was used for obturation, which is a temporary root canal filling material with excellent radiopacity (figure 2). Coronal restoration was done with GIC followed by stainless steel crown within 7 days of the pulpectomy in both the groups. In Group II, the clinical procedure followed was the same as for Group I, except

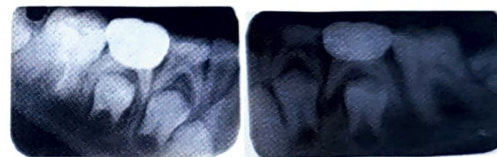
Figure 2. IOPA of treated 75 at 3 month (a) and 6 month (b) follow up for group I using conventional pulpectomy technique



At 3 months follow up At 6 months follow up

that after smear layer removal the canals were dried with absorbent paper points the orifices were sealed with Cavit and coronal restoration was done with GIC and followed by stainless steel crown (figure 3).

Figure 3. IOPA of treated 85 (a) at 3 month and 6 month (b) follow up for group II pulpectomy without obturation



At 3 months follow up At 6 months follow up

Evaluation

All the teeth were evaluated at baseline, 3 and 6 months. Clinical parameters evaluated were pain (VAS), swelling, tenderness to percussion, mobility, sinus tract and abscess (Table 2). Radiographic parameters were also evaluated e.g. internal resorption, external resorption, periradicular and inter-radicular radio lucency (Table 3).

RESULTS

Pain score at baseline was between 6-7 according to VAS (Visual Analog Scale, Table 1). During follow up evaluation all teeth were asymptomatic at 3 and 6 months in both the groups. None of the patients showed any signs of swelling, tenderness to percussion, mobility, sinus tract or abscess formation at 3 and

Table 1: Mean scores of Visual Analogue Scale (VAS) at Baseline, 3 and 6 Months in Group I and Group II

Parameter	Group	N	Duration	Mean $\pm$ SD	P-value
Pain	Group I	15	Baseline	6.47 $\pm$ 0.52	0.579
		15	3 Months	0	
		15	6 Months	0	
	Group II	15	Baseline	6.47 $\pm$ 0.52	
		15	3 Months	0/*9+	
		15	6 Months	0	

6 months in Group I. Similar findings were observed in Group II except a sinus tract in relation to the treated tooth at 6 month evaluation (Table 2).

None of the patients reported any radiographic pathology i.e. internal resorption, external resorption, inter radicular or periradicular radiolucency at 3 and 6 months in group I. Peri-radicular radiolucency was seen in one patient at 6 months who also reported

of group I was 100% percent clinical as well as radiographic compared to 93.3% and 86.7% clinical and radiographic success, respectively of Group II.

DISCUSSION

The carious process if not managed at an early stage can lead to pulpal involvement. Pulp ally involved primary teeth need to be treated by pulpotomy or pulpectomy depends

with sinus tract. One more patient also reported with radiographic failure with inter-radicular radiolucency and external root resorption in group II (Table 3).

Overall success

on the extent of carious involvement of the tooth. The rationale to preserve the primary teeth is to aid in mastication, prevent aberrant tongue habits, prevent possible speech problems, maintain esthetics and prevent psychological effects associated with early tooth loss and maintain normal function till the eruption of succedaneous teeth. Endodontically treated primary tooth is always preferred compared to a space maintainer.

Pulpectomy of primary teeth is still considered gold standard to retain primary teeth till their normal exfoliation. The age range chosen for this pilot study was 7-9 yrs, as the pulp response at this age range is not very strong and even in case of failure child won't be affected much because the succedaneous tooth would erupt soon. All pulpectomies were performed under rubber dam

Table 2. Comparative Evaluation of the Clinical Parameters in Group I and Group II

Parameter	Duration	Group I (N=15)	Group II (N=15)	P - value
Swelling	Baseline	0	0	
	3 Months	0	0	
	6 Months	0	0	
Tenderness on Percussion	Baseline	0	0	
	3 Months	0	0	
	6 Months	0	0	
Mobility	Baseline	0	0	
	3 Months	0	0	
	6 Months	0	0	
Sinus Tract	Baseline	0	0	1.000
	3 Months	0	0	
	6 Months	0	0	
Abscess	Baseline	0	0	
	3 Months	0	0	
	6 Months	0	0	

Table 3. Comparative Evaluation of the Radiographical Parameters i.e., Internal Resorption, External Resorption, Inter radicular Radiolucency, Peri-radicular Radiolucency at Baseline, 3 & 6 Months

Parameter		Group I (N=15)	Group II (N=15)	P - value
Internal Resorption	Baseline	0	0	
	3 Months	0	0	
	6 Months	0	0	
External Resorption	Baseline	0	0	1.0
	3 Months	0	0	
	6 Months	0	0.1	
Periradicular Radiolucency	Baseline	0	0	
	3 Months	0	0	
	6 Months	0	0	
Inter radicular Radiolucency	Baseline	0	0	1.0
	3 Months	0	0	
	6 Months	0	0.1	
Abscess	Baseline	0	0	0.37
	3 Months	0	0	
	6 Months	0	0	

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isolation. Obturation of the root canal was done in Group I and no obturation was done in Group II. The importance of coronal seal over apical seal implicated in the present study was taken from literature reviewed by Machotu P.⁵ Therefore, in the present study emphasis has been given to canal preparation, disinfection and coronal seal. Cleaning and shaping of the root canal was carried out progressively to increase the diameter with simultaneous copious irrigation of normal saline and metrogyl and followed by final irrigation with 17% EDTA and 3% NaOCl for smear layer removal. EDTA is an effective chelating agent, which is widely used in endodontic preparation.⁶ It effectively removes smear layer by chelating the inorganic component of the dentine. Therefore, by facilitating cleaning and removal of infected tissue, EDTA contributes to the elimination of bacteria in the root canal.⁷ Niu et al.⁸ studied the ultra structure of the canal walls after EDTA and combines EDTA plus NaOCl irrigation by scanning electron microscopy; more debris was removed by irrigation with EDTA followed by NaOCl than EDTA alone. Removal of smear layer is an important step to facilitate disinfection of the root canal. Met apex was used as an obturating material which is composed of calcium hydroxide 30.3%, idoform 40.4%, silicon oil 22.4% and others 6.9%. The material is harmless to permanent tooth germ and gets resorbed within few weeks when extruded accidentally from the apex.⁹⁻¹¹ Pulp ally involved primary teeth need stainless steel crown as loss of dentin during access cavity

preparation weakens the crown.¹²

The case treated was considered successful clinically, if there was absence of pain, tenderness on percussion, any other pathology, and absence of mobility at 3 and 6 months. The case was considered successful radiographically, when there was absence of any periradicular or inter-radicular radio lucency, internal or external root resorption. The appearance of any radio lucency at 3 and 6 months examination was considered as a radiographic failure.

Presence and absence of pain was evaluated using VAS method and it came down to 0 at follow up of 3 and 6 months (Table 1). This infers that the pain can be completely eliminated after removal of the coronal and radicular pulp irrespective of the obturation done or not. None of the patients in group I reported with any of the other clinical parameters like abscess, sinus tract, swelling, tenderness to percussion and mobility at 3 and 6 months which represent 100% clinical success (Table 2). A study done by Mortazavi¹³ and Mesbahi²⁰⁰⁴ on 58 primary teeth showed 100% success of pulpectomy obturated by Met apex and a clinical success of 96% has been shown in an another study done by Trairatvorakul and Chunlasikaiwan²⁰⁰⁸.¹⁴ Dass¹⁵ and Gupta²⁰¹⁶ reported 90.38% success with Met apex at 6 month follow up. In group II, one of the patients reported with sinus tract at 6 month follow up which shows clinical success of 93.3%. Statistical analysis shows no significant difference between

the 2 groups based on clinical success of pulpectomy (Table 2).

No patient in Group I showed presence of any pathology i.e. internal resorption, external resorption, periradicular or inter-radicular radio lucency at 3 and 6 months (Table 3). Similar findings were reported in Group II at 3 months whereas at 6 months 2 patients showed radiographic failure. In group II, radiographic success rate found was 86.7% as compared to 100% success rate of Group I. Studies reported radiographic success rate of pulpectomy done with Met apex to be in the range of 81.1% -100%.^{9, 15}

Although standard disinfection protocol and technique were followed in both the groups, 2 cases failed radiographically at 6 months in Group II. Reason behind the failure of newer concept might be some focus of infection left in the unobtured root canals which eventually flared up and lead to failure. Whereas 13 cases at 6 months follow up showed good results both clinically as well as radiographically with newer concept and out of these 13 cases 3 cases evaluated till 12- 14 months with good results both clinically and radiographically. The results of the present study indicated that periodontal health of endodontically treated teeth depends on the quality of endodontic procedure, disinfection of the root canals and coronal restoration

CONCLUSION

In recent years emphasis is laid down on the meticulous cleaning, shaping and disinfection of the

root canal system with good coronal seal. Pulpectomy without obturation can be considered as an acceptable alternative to conventional pulpectomy, if root canal preparation and disinfection of the root canal is done properly. Long term follow up is required on a larger sample size to implement the newer technique as a routine procedure.

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... more references on request

FIRST-EVER STUDY SHOWS E-CIGARETTES CAUSE DAMAGE TO GUM TISSUE

The study, published in *Oncotarget*, was led by Irfan Rahman, Ph.D. professor of Environmental Medicine at the UR School of Medicine and Dentistry, and is the first scientific study to address e-cigarettes and their detrimental effect on oral health on cellular and molecular levels.

Electronic cigarettes continue to grow in popularity among younger adults and current and former smokers because they are often perceived as a healthier alternative to conventional cigarettes. Previously, scientists thought that the chemicals found in cigarette smoke were the culprits behind adverse health effects, but a growing body of scientific data, including this study, suggests otherwise.

"We showed that when the vapors from an e-cigarette are burned, it causes cells to release inflammatory proteins, which in turn aggravate stress within cells, resulting in damage that could lead to various oral diseases," explained Rahman, who last year published a study about the damaging effects of e-cigarette vapors and flavorings on lung cells and an earlier study on the pollution effects. "How much and how often someone is smoking e-cigarettes will determine the extent of damage to the gums and oral cavity."

The study, which exposed 3-D human, non-smoker gum tissue to the vapors of e-cigarettes, also found that the flavoring chemicals play a role in damaging cells in the mouth.

Most e-cigarettes contain a battery, a heating device, and a cartridge to hold liquid, which typically contains nicotine, flavorings, and other chemicals. The battery-powered device heats the liquid in the cartridge into an aerosol that the user inhales.