ORIGINAL ARTICLE

SUCCESS RATE OF VITAPEX® AS AN OBTURATING MATERIAL IN PRIMARY MOLARS

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ABSTRACT

The aim of this study was to determine the success rate of Vitapex® as an obturating material for primary teeth. A total of 50 patients with non-vital necrotic pulp of lower primary molars were selected. They were treated with contemporary treatment of pulpectomy. After disinfections of canals, obturation was done with Vitapex® and restoration of tooth was done. Clinical and radiographic examination was done at one, two and three month intervals. The teeth were evaluated for pain, tenderness to percussion, swelling, presence of radiolucency. Results showed out of 50 patients, 24 were females and 26 were males. Age of patients ranged from 5 years to 10 years with a mean value of 7.2 and standard deviation ±1.6. Success rate of Vitapex was 88% (44 patients) and 12 %(6 patients) cases were in failure. It was concluded that 88% success rate of Vitapex®, showed promising results to save a restorable primary tooth until its normal exfoliation.

Key words: *Necrotic primary teeth, Pulp therapy, Obturating material, Iodoform, Calcium hydroxide, Vitapex.*

INTRODUCTION

Dental caries is an important dental public health problem and also the most prevalent oral disease among children and adults in the world. This disease not only causes damage to the tooth, but is also responsible for several morbid conditions of the oral cavity and other systems of the body.[1] Endodontic treatment (pulpectomy) is a preferred procedure for preserving a restorable primary tooth with an infected or necrotic pulp. The advantages of pulpectomy include preserving masticatory functions, maintaining spaces for permanent succedaneous teeth, and avoidance of untimely eruption of permanent teeth.[2,3] However, anatomic complexities, dynamic alteration at the root apex and perceived difficulties in behavior management of children make pediatric endodontic treatment a demanding task.[4]

Endodontic filling materials may be considered true implants as they touch and are based in vital tissues of the body, and protrude to meet the external surface directly or, more appropriately, indirectly via another surface restoration. It follows that the materials must possess several different properties relative to their functions and location, ranging from biocompatibility to mechanical sealing ability.[5] The materials used for filling the root canals in primary teeth should be antibacterial, resorbable, and harmless to periapical tissues and the developing tooth bud. In addition, it must easily fill the canals, adheres to walls, not shrink, must readily absorb if passed beyond the apex, be easily removed if necessary, be radiopaque and cause no discoloration of the tooth. At present there is no such material fulfilling these ideal requirements.[4,5,6]

The traditional root canal filling materials for primary teeth are calcium hydroxide (Ca (OH) 2), zinc oxide (ZnO), and zinc oxide eugenol (ZnOE) with or without formocresol (FC) or iodoform paste. Recently VitapexTM paste (a mixture of iodoform 40.4%, calcium hydroxide 30.3%, and silicone 22.4%) gave a higher success rate (84.7%) with good healing and resorptive capabilities.[6]

The rationale of this study is to promote the pulpectomy procedures, by using Vitapex as an obturating material in primary molars. Vitapex has good healing and regeneration properties, so by using this, untimely extraction of tooth may be avoided and tooth can be retained until normal exfoliation.

METHODOLOGY

Patients seen in operative outpatient department at Armed forces institute of dentistry Rawalpindi

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and fulfilling inclusion criteria were included in the study. The sample consisted of 50 non-vital primary mandibular teeth from both genders having age 5-10 years. One tooth per child was selected for the study. A thorough clinical and radiographic examination was performed. The criteria for selection of the teeth included in the study were: the presence of soft-tissue abscesses or sinus tracts around the tooth; evidence of pathologic processes on the radiographs, ranging from slight thinning of the trabecular pattern to large areas of radiolucency in the furcation and/or periapical region; or little or no pulp tissue remaining when the pulp chamber was entered. Teeth were excluded when they were not restorable or if they had a perforated pulpal floor. Patients with significant medical problems were also excluded, as were teeth with evidence of internal or external root resorption involving more than one third of the root length.

Informed consent was obtained from patient's legal guardians. No ethical issue or risk was involved to the patient. Tooth was isolated by rubber dam and local anesthesia used where required. Caries was removed with tungsten carbide fissure bur supported with slow speed hand piece. The coronal pulp tissue was removed with a spoon excavator. Radicular pulp tissue was removed with fine barbed broaches while copious irrigation carried out to remove necrotic pulp tissue. ISO No. I5 (Mani Inc. Japan) reamers were placed in the canals and working length was taken with a radiograph. The working length was kept 1 mm short of the radiographic apex and cleaning and shaping of the root canals were carried out using Hedstrom files 21 mm at working length. The files were used sequentially in a step-back technique up to a maximum size of No. 40. Irrigation with 2.5% sodium hypochlorite and saline was continuously done throughout the instrumentation.

Root canals were filled with Vitapex® on same visit following the manufacturer's instructions. The apical end of the canal was filled first and the remaining canal space subsequently filled by lentilu spiral. An immediate post-operative radiograph was taken and restoration of the endodontically treated teeth was done with appropriate material in the same appointment. Clinical and radiographic examination was undertaken at one, two and three month intervals. The teeth were evaluated for pain, tenderness to percussion, swelling, and presence of radiolucency. All procedures were done and followed up by the same operator.

The cases treated were considered as successful clinically when the following conditions were met: negative history of pain, absence of any swelling and absence of tenderness to percussion. The cases were considered radiographically successful when the radiolucency either decreased or was not increased beyond the size of the pre-operative status increase in size of radiolucency at the three-month examination was considered as radiographic failure.

Data were entered in SPSS version 17.0. The study variables were patient's age, gender and success. The quantitative data, that is, age was presented as mean with standard deviation. The qualitative variables in data, that is, gender and success, were presented as frequency and percentages.

RESULTS

Fifty patients were treated. Out of 50 patients 24 were females and 26 were males. Age of patients ranged from 5 years to 10 years with mean value of 7.2 and standard deviation of ±1.6. Overall success rate of Vitapex® was 88% (44 patients) and 12% (6 patients) cases were in failure after three months follow up.

DISCUSSION

Pulp therapy for deciduous teeth aims to preserve the child's health and to maintain deciduous teeth, where pulp tissue is affected by caries, dental trauma, or other causes, in a functional state until they are replaced by permanent teeth.[7] When the pulp has become irreversibly infected or necrotic, a root canal treatment is indicated.[2] Pulp therapy is widely used in the treatment of paediatric patients, while attempting to prevent premature exfoliation of the primary teeth. The main objective of endodontic treatment is total elimination of microorganisms from the root canal, and the prevention of subsequent reinfection. This is achieved by careful cleaning and shaping followed by the complete obturation of the canal space. The ultimate goal of endodontic obturation has remained the same

TABLE 1: GENDER DISTRIBUTION

	Frequency (%)	Cumulative percent
Valid Female	24(48%)	48.0
Male	26(52%)	100.0
Total	50	

TABLE 2: COMPARISON OF AGE

	Frequency (%)
Valid 5 years	8(16%)
6 years	11(22%)
7 years	12(24%)
8 years	7(14%)
9 years	4(8%)
10 years	8(16%)
Total	50(100%)

TABLE 3: CLINICAL AND RADIOGRAPHIC EVALUATION ACCORDING TO FOLLOW-UP

Follow Up (In Months)	Number Of Teeth Followed Up	Clinical Evaluation			Radiographic Evaluation		Failed cases (%)	Total Cases Followed Up
		History of pain	Presence of swelling	Tenderness to percussion	Radiolucency decreased/ no increase	Increase in radiolucency		
1	50	2	0	2	48	2	6(12%)	50
2	50	2	1	1	48	2	6(12%)	50
3	50	2	1	1	48	2	6(12%)	50

TABLE 4: SUCCESS RATE OF VITAPEX® AFTER THREE MONTHS

	Frequency	Percent	Valid Percent	Cumulative Percent
Success No	6	12.0	12.0	12.0
Yes	44	88.0	88.0	100.0
Total	50	100.0	100.0	

for the past fifty years: to create a fluid-tight seal along the length of the root canal system, from the coronal opening to the apical termination.[8]

In present study, Vitapex® was used to determine the success rate in primary molars as an obturating material. Success rate was found to be 88% after three months, which is low as compared to the study of Nurko and C-Garcia[9], in which it showed 100% success rate. They followed 33 teeth for 3 to 22 months treated with Vitapex®. All teeth had periapical infection, mobility and perical radiolucency. At 3 months times signs and symptoms of infections were resolved, periapical radiolucency decreased in size and teeth showed no mobility or very little mobility. The paste which was extruded beyond apices was resolved completely within two months. The increased success rate of their study as compared to present study may be due to long follow up and smaller sample size of their study.

Because of the anatomy of primary roots and furcal areas, it is difficult to avoid the extrusion of filling materials beyond the root canals in all pulpectomy cases. Therefore, an intra-radicular filling material should be non-toxic and easily resorbable.[10] Vitapex® appeared to be resolved completely from extra dentinal sites over a period of three months in whose cases in which it was extruded. This is consistent with the findings of Kawakami[11] and Garecia.[10] Kawakami[11] studied the resosrbility of Vitapex®. In an experimental study on dogs he adventrely extruded Vitapex® beyond apical foramina of tooth and pushed it further into mandibular canal. Histological and radiographic studies showed that paste was resorbed over time. Histologically macrophages were appeared to be involved in this process.

Chutima et al[12] compared the success rate between zinc oxide eugenol and Vitapex® in primary molars. In their studies, fifty-four mandibular primary molars from 42 children (average age 5.6±1.2 years) that met the inclusion criteria were allocated to either test material via block randomization. A single visit pulpectomy and stainless steel crown was performed. At 6 and 12 months, the ZOE success rates were 48% and 85%, respectively, and the Vitapex® success rates were 78% and 89%. They further concluded that Vitapex appeared to resolve furcation pathology at a faster rate than zinc oxide-eugenol at 6 months. Their results are similar to present study, that success rate of Vitapex® is 88% and clinical and radiographic signs and symptoms resolved in three months.

Nakornchai at el[13], Vitapex® showed variable results over a period of one year. They studied fifty teeth from 37 healthy children aged 3-8 years with pulpally involved primary molars requiring root canal procedures. These teeth were treated with 3Mix (combination of metronidazole, ciprofloxacin and minocycline as a paste) or Vitapex® before restoration with stainless steel crowns. Their research employed a prospective single-blinded randomized design. The subjects were followed up clinically and radiographically at 6 and 12 months, respectively. Both groups showed 100% and 96% clinical success at 6 and 12 months, respectively. At 6 months, radiographic success of 3Mix and Vitapex® was 84% and 80%, respectively, and at 12 months,

radiographic success of 3Mix and Vitapex® was 76% and 56%, respectively. At 6 month evaluation, results of this study are similar to present studies but when these teeth followed at 12 months radiographic success rate decreased upto 56%.

Chen XX at el[14] compared the clinical and radiographic success rates of a modified primary root canal filling (ingredients: zinc oxide-eugenol, iodoform and calcium hydroxide, MPRCF) vs. zinc oxide-eugenol cement (ZOE) and calcium hydroxide/iodoform paste (Vitapex) in pulpectomized primary molars at the end of 6 and 12 months. At the end of 6 and 12 months, the ZOE and MPRCF success rates were 100% both in clinical and radiographic evaluation. The Vitapex group showed the clinical success of 100% at the end of 6 months and 94.5% at the end of 12 months. Radiographic evaluation for the Vitapex group showed 80.4% success at the end of 6 months and 60.7% at the end of 12 months. The clinical success rate of Vitapex was greater as compared to present study but radiographic success rate was much lower after six months. The increased clinical success rate of their study may be due to two visit pulpectomy procedure as compared to single visit pulpectomy procedure in present study.

CONCLUSION

Vitapex showed good results in preserving primary teeth by its various antibacterial and healing properties.

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CONTRIBUTION BY AUTHORS

1 Muzzamil Jamil Ahmed Rana:	Selection of title, designed the study, selected patients and done statistical work.
2 Hafiz Rabbi Ul Ehsan:	Originally performed all procedures on patients and followed up, introduction and reference writing.
3 Madiha Batool:	Literature review and data collection.