Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 11, pp.61473-61477, November, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

REVISIT OF ENDODONTIC PRESSURE SYRINGE OBTURATION TECHNIQUE – PULPECTOMY PROCEDURES IN NECROTIC PRIMARY MOLARS

Dr. Nagarathna, C., * Dr. Veena, R. L. Dr. Jaya Agali Ramachandra and Dr. Umapathy Thimmegowda

Department of Pedodontics and Preventive Dentistry, Rajarajeswari Dental College and Hospital, Bangalore 560074

ARTICLE INFO

Article History:
Received 27th August, 2017
Received in revised form
10th September, 2017
Accepted 08th October, 2017
Published online 30th November, 2017

Key words:

Endodontic pressure syringe,
Lentulospiral,
Obturation Techniques,
Primary Teeth, Pulpectomy,
Randomized clinical trial.

ABSTRACT

Aim: The aim of the study is to evaluate the efficiency of hand held lentulospiral (HHL) and endodontic pressure syringe techniques in primary molar radiographically using endoflas obturating material.

Background: Successful endodontic therapy needs preparation of an aseptic root canal and sealing of the root canal system. Many investigations have been carried out to evaluate and compare the success rate of obturating techniques for primary teeth and major research in the area of finding newer obturating techniques is ongoing. The literature regarding the comparison of comparative efficiency of hand held lentulospiral and endodontic pressure syringe is relatively sparse. Therefore the present clinical study is undertaken to radiographically compare, the primary teeth obturation with hand held lentulospiral and endodontic pressure syringe.

Study design: The present study was conducted on twenty primary molars indicated for pulpectomy in the age groups between 4 to 8 years. The teeth were randomly divided into two groups (group I and II). Group I (control group) obturated with hand-held Lentulo spiral and group II (test group) obturated with endodontic pressure syringe respectively. Post-operative evaluation was done for: a) quality of canal obturation, (under fill, optimally fill, or overfill) and b) presence of voids in each third of the root canal. The obtained data were analyzed using Chi-square test and Mann Whitney U test.

Results: The results of the present study showed 50% of the canals were optimally filled, 40% were overfilled and 10% were under filled in control group. In test group were filled using endodontic pressure syringe showed, 70% of canals were optimally filled, 30% of canals were overfilled and there was no underfilled canals. The present study also showed higher number of voids in the middle 1/3rd of the control group than in the test group. There was no statistically significant difference between both the techniques.

Conclusion: The obturation of primary molar teeth using hand held lentulospiral and endodontic pressure syringe though showed presence of voids in both the groups did not significantly affect the quality of root canal fillings.

Citation: Dr. Nagarathna, C., Dr. Veena, R. L. Dr. Jaya Agali Ramachandra and Dr. Umapathy Thimmegowda, 2017. "Revisit of endodontic pressure syringe obturation technique – pulpectomy procedures in necrotic primary molars", *International Journal of Current Research*, 9, (11), 61473-61477.

INTRODUCTION

Dental caries is one of the most common diseases of the primary dentition. Maintaining the integrity of primary teeth until its normal exfoliation is the primary goal of pediatric dentistry (Dandashi *et al.,* 1993), (Guelmann *et al.,* 2004), (Nagar *et al.,* 2011). According to the guidelines of the American Academy of Pediatric Dentistry, pulpectomy is indicated in primary teeth with carious pulp exposures in which following coronal pulp amputation, the radicular pulp exhibits clinical signs of hyperemia or evidence of necrosis of the radicular pulp with or without caries involvement. 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 for the past 50 years to create a fluid tight seal along the length of the root canal system from the coronal opening to the apical termination. Along with composition and mixing of obturating materials the various technique of obturating the primary root canals play a major role in the success (Mahajan *et al.,* 2015), (Hiremath *et al.,* 2016). Various techniques for the obturation of primary teeth are Endodontic pressure syringe, Mechanical syringe, Tuberculin syringe, Jiffy tube, Incremental filling technique-using endodontic plugger, Navy tip, Lentulospiral technique (Vashista *et al.,* 2015). Of which lentulospiral and incremental

******Corresponding author:* **Veena, R.L.**
Department of Pedodontics and Preventive Dentistry, Rajarajeswari Dental College and Hospital, Bangalore 560074.

filling technique are most commonly used. Since very few studies have compared the effectiveness of hand held lentulospiral and endodontic pressure syringe in literature under *in-vivo* conditions. The present study aims to radiographically compare the efficacy of hand held lentulospiral and endodontic pressure syringe technique in obturation of primary molars.

Aim

To evaluate the efficacy of hand held lentulospiral and endodontic pressure syringe as an obturating method in primary molars.

Objectives

To evaluate and compare the obturation of primary molars using hand held lentulospiral technique and endodontic pressure syringe for

a) Quality (underfill/optimal fill/overfill) of obturation
b) Presence of voids.

MATERIALS AND METHODS

Fifteen healthy child who visited the Department of Pedodontics and Preventive Dentistry Rajarajeswari dental college and hospital Bangalore aged between 4 to 9years with 20 infected teeth requiring pulp therapy were selected for the study. Inclusion criteria were

- History of spontaneous pain
- Presence of inter-radicular radiolucency.
- Tooth planned for pulpectomy in which the radicular pulp exhibits clinical signs of irreversible pulpits.
- Necrotic teeth with swelling and pus discharge, sinus tract or fistula

An informed consent was taken from all the parents after explaining them the entire procedure in detail, before starting the treatment. Ethical clearance was obtained before the study was carried out. Teeth were randomly involved into two groups.

Group I: Control Group (10 teeth) were hand held lentulospiral was used for obtuartion and
Group II: Test Group (10 teeth) were Endodontic Pressure Syringe (Figure 1) was used for obturating the canals of primary molars.

Pre operative radiographs were taken and the tooth was anesthetized and isolated with rubber dam. Before gaining access, all caries was excavated using large round bur. The pulp chamber's roof was removed with a no. 330 tungsten carbide bur in a high-speed hand piece. The pulp chamber was cleaned using a slow-speed no. 4 round bur. Complete extirpation of the remaining pulp tissue was carried out using barbed broaches. The working length was recorded as the length of the initial file at the apical foramen minus one mm. Standard hand files were used to enlarge the canals and rinsed with ten ml of normal saline and dried with absorbent paper points. All canals were prepared for obturation. A homogenous mixture of Endoflas (Sanlor and Cia. S. en C.S., Cali, Colombia) was used according to the manufacturer's instruction for filling the root canal using one of the randomly assigned obturation techniques. Teeth of group I were obturated with size 25 handheld lentulospiral and group II, teeth were obturated with endodontic pressure syringe of 30 gauge needle. A postoperative radiograph using phosphor imaging plate system and vista scan was taken immediately. A controlled double blinded study was carried out to evaluate the quality of obturation and presence of voids and their number and area (size, mm) in each third of the root canal.

Statistical analysis

Data collected was statistically analyzed using SPSS software V.22, IBM., Corp. The frequency distribution for the categorical variables was expressed in terms of number and percentage, whereas for continuous variables, was expressed in terms of Mean and SD. Chi square test was used to compare the propotional difference in the distribution of root canal obturation characteristics between Experimental and Control group. Mann Whitney U test was used to compare the difference in the mean number of voids between experimental and control group in different areas of root canal.

The level of significance (P-value) was set at $P<0.05$

RESULTS

In the present study double blinded study was done to the filling technique assessed for radiopacity, presence of voids and canal obturation quality using radiographs. Chi square test was used to compare the quality of obturation which showed no statistically significant difference between two groups which is depicted in Table 1. Mann Whitney U test was used to compare the mean number of voids in different areas of root canal using two different types of obturating systems. The test results revealed that the number of voids was higher in the control group at the coronal and apical areas with mean score of 0.9 ± 1.0 and 1.0 ± 0.5 as compared to test group with mean score of 0.1 ± 0.4 and 1.0 ± 0.5 respectively. However, there was no statistically significant difference with respect to mean number of voids at coronal and apical third areas between the two systems, P=0.11 & P=0.30 respectively (Table 2). In contrast, the test group presented with more number of voids in the middle third area with mean score of 1.3 ± 0.5 as compared to control group with 0.9 ± 1.1. But, there was no statistically significant difference between the two systems, P=0.22. Though, the present study findings infers that there was lesser number of voids in the test group compared to the control group, it did not yield a statistically significant difference between the two obturating systems.

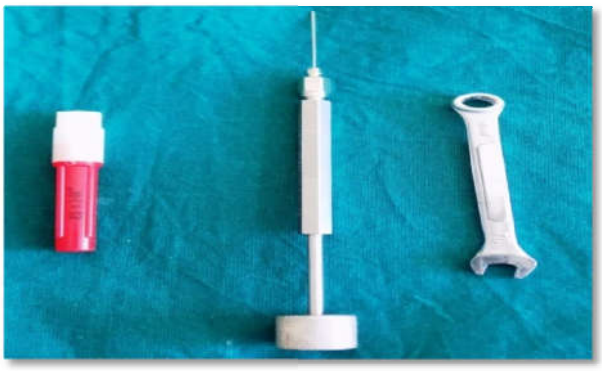

Fig. 1. Endodontic pressure syringe

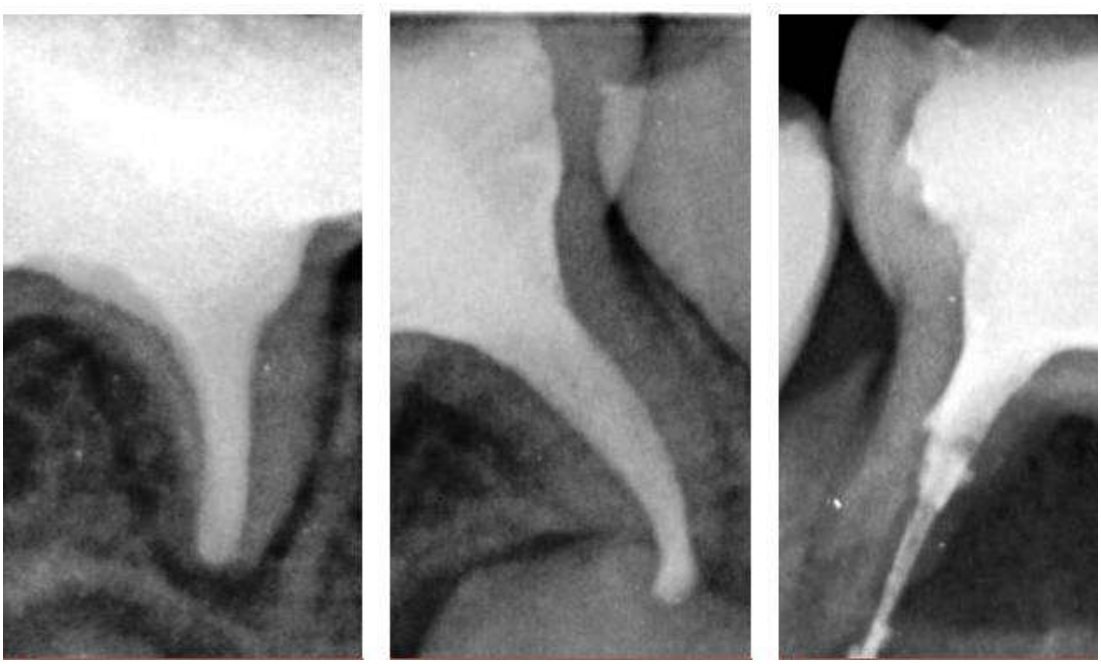

Fig. 2. Radiograph showing quality of obturation using endodontic pressure syringe (a) Optimal fill (b) over fill (b) presence of voids

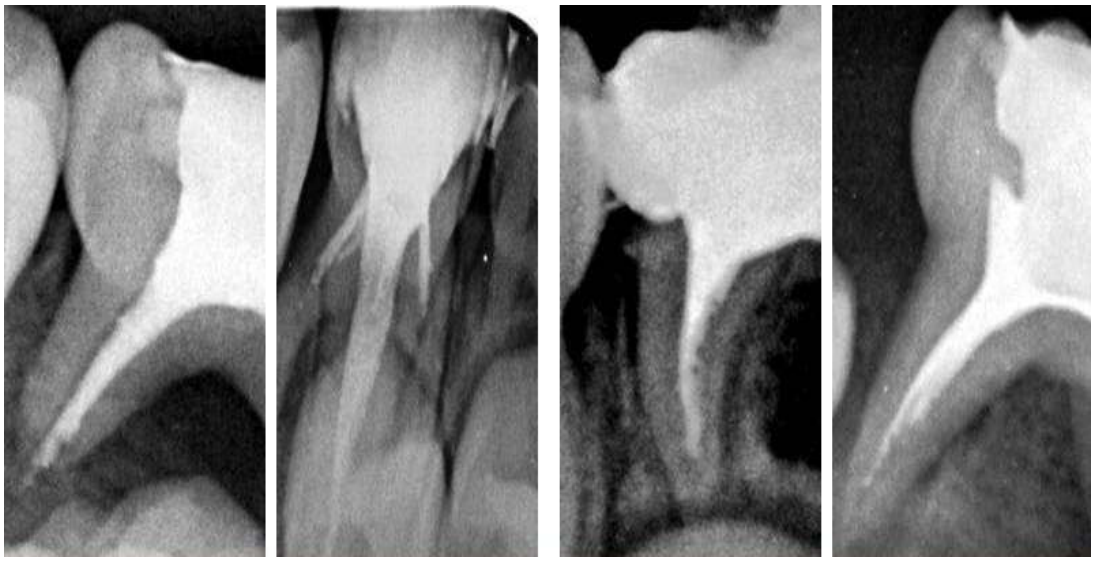

Fig. 3. Radiograph showing quality of obturation by using handheld lentulospiral (a)optimal fill (b) overfill (c)voids (d) under fill

Table 1. Comparison of root canal obturation characteristics between two study groups using Chi Square test

Variables	Categories	Control Group		Test Group		Chi square Value	P-value
		n	%	n	%		
Depth of Fill	Under fill	1	10%	0	0%	1.476	0.48
	Optimal	5	50%	7	70%		
	Overfill	4	40%	3	30%		
Voids	Present	8	80%	7	70%	0.267	0.61
	Absent	2	20%	3	30%		

Table 2. Comparison of mean number of voids in different areas of root canal between two study groups using Mann Whitney U test

Area	Group	N	Mean	SD	S.E.M	Mean Diff	Z	P-value
Coronal	Control	8	0.9	1.0	0.4	0.7	-1.595	0.11
	Test	7	0.1	0.4	0.1			
Middle	Control	8	0.9	1.1	0.4	-0.4	-1.237	0.22
	Test	7	1.3	0.5	0.2			
Apical	Control	8	1.0	0.5	0.2	0.3	-1.046	0.30
	Test	7	0.7	0.5	0.2			

DISCUSSION

Pulpal diseases are one of the most common infection affecting the primary teeth. Early loss of primary teeth result in loss of arch length, insufficient space for erupting permanent teeth, impaction of premolars and mesial tipping of molar teeth adjacent to the lost primary molar. Thus pulpectomy is a conservative approach to reasonable treatment option to ensure either normal shedding/ eruption of the successor or a long term survival in instances of retention. It involves root canal preparation followed by filling with resorbable obturating materials without any voids (Bawazir *et al.,* 2006). Resorbable nature and antimicrobial properties of the filling material determine the success of pulpectomy in a primary tooth (Rewal *et al.,* 2014). The success of pulp therapy in primary teeth mainly depends on extripation of the pulp, thorough debridement of the root canal and fluid tight seal from enamel to apical 1/3rd. Many investigations have been carried out to evaluate and compare the success rate of different obturating techniques in primary teeth. However, in vivo evaluation of the use of hand held lentulospiral and endodontic pressure syringe technique has not been investigated much in the literature. For this reason, we carried out this invivo investigation to evaluate and compare the obturation of primary molars using these two techniques for quality of obturation and presence of voids. According to Grossman (1981) the obturating material should extend up to or be slightly short of the apex in patients of pulpectomy and preferably extend up to the apical foramen in teeth which show areas of rarefaction.

The ideal root canal filling material for primary teeth should resorb at a similar rate as the primary root and should resorb readily if pressed beyond the apex. For this reason we selected endoflas as an obturating material because it has an advantage of resorption when overextended periapically and it did not resorb intraradicularly when compared to ZnOE and other iodoform based pastes (Fuks *et al.,* 2002). Within seven days the extruded materials become resorbed. After three months, optimal obturation with normal periapical region was seen in the radiograph, with no resorption within the canal. Thus, the material is neither resistant to resorption nor does it result in the hollow tube effect. Endoflas has a broad spectrum of antibacterial efficacy, hydrophilic and can be used in mildly humid canals with the ability to disinfect dentinal tubules and hard-to-reach accessory canals that cannot be disinfected or cleansed mechanically (Sunitha *et al.,* 2014). Earlier Ramar & Murgara (2010) observed a much higher success rate with Endoflas (95%) compared to other materials, and also reported healing ability, bone regeneration characteristics and resorption of excess Endoflas without washing within the roots (Ramar *et al.,* 2010).

Hand held lentulospiral technique is a traditionally used technique for obturation of primary teeth. Various studies have compared hand held lentulospiral with other obturation techniques like endodontic file, syringe, bidirectional spiral etc and hand held lentulospiral technique showed better result (Parikh *et al.,* 2000), (Bawazir *et al.,* 2006), (Bandari *et al.,* 2012), (Vashista *et al.,* 2015). Dandashi et al suggested that the incremental and the rotary lentulospiral techniques would reduce the chances of extrusion of paste when delivering into primary root canals (Dandashi *et al.,* 1993). The design and flexibility of the Lentulospiral allow files to carry the paste uniformly throughout the narrow, curved canals in primary molars. Although there are reports that indicate if a Lentulo spiral separates in the root canal system, retrieval could be very difficult or impossible (Torres *et al.,* 2004). Though lentulospiral is a widely accepted successful technique for delivery, even experienced operators need to reinsert material to ensure better filling quality. Difficulties with fitting the rubber stop, instrument fracture, and a tendency for extrusion beyond the apex are disadvantages of the Lentulo instruments (Fig 3).

The main advantage of endodontic pressure syringe is the screw mechanism which generates pressure that helps in pushing the material into the root canals hence resulted in maximum optimal filled canals (Fig 2). Similar results was made by Mallayya et al in which endodontic pressure syringe produced best results (95.8% optimal fillings) in terms of length of root canal obturation when compared with jiffy tube, insulin syringe and local anesthetic syringe (Vashista *et al,* 2015). In the present study there were no under filled canals by using endodontic pressure syringe. The possible reason could be the design of the pressure syringe in which hub of the syringe being small and thin, needle provided a better reach till middle one third of the canals. In the present study, more number of overfilled canals were observed with pressure syringe than under filled canals. According to Grover et al the highest number of overfilled canals was observed with pressure syringe when comparing with lentulospiral, past inject and bi directional spiral (Subba *et al.,* 1997). This might be due to excessive pressure placed while placing the material into the canal, when the quarter turn of the screw was made.

The consistency of the materials and displacement of rubber stopper, unprecise working length measurement, over instrumentation, resistance disappearance due to inadequate root canal preparation also could be factors for overfilled canals in our study. However, few drawbacks are associated with endodontic pressure syringe, namely difficulties in placing the rubber stop correctly and removing the needle (because of the need to refill the hub of the syringe several times during the procedure) may lead the clinician to remove and reinsert the syringe repeatedly, which in turn may displace the paste, create voids and thus decrease filling quality.

In addition, the need to clean the syringe immediately after use makes this method more complex and time consuming. Voids in lentulospiral also may be due to air bubbles entrapped in the paste during mixing of the powder with the liquid and due to repeated removal and reinsertion of the instrument during filling procedure. Dandashi et al reported fewer voids with pressure syringe technique when compared to the lentulospiral, tuberculin syringe and packing method (Bhandari *et al.,* 2012). In contrast to our study, Memarpour et al found the highest frequency of voids (87%) with pressure syringe and packing groups (Memarpour *et al.,* 2013). These findings are similar to those of Grover et al who found that the pressure syringe was better than lentulospiral in controlling voids, as lentulospiral had the highest percentage of voids in canals as compared to pressure syringe (Grover *et al.,* 2010). Endodontic pressure syringe provides the best results when compared to other techniques including handheld lentulospiral. However the application of endodontic pressure syringe system in routine pediatric dental practice is hampered due to the initial practical difficulty of handling this system by an inexperienced operator. Once practiced and regularly being used on daily basis operators can achieve impeccable obturation even in narrow canals.

Conclusion

Based on this study results, the following conclusion can be made:

- There was no statistically significant difference between the use of pressure syringe or lentulospiral on the quality of root canal filling.
- Both techniques gave maximum optimal obturation.
- Voids were more in use of handheld lentulospiral technique than in pressure syringe technique.

REFERENCES

American Academy of Pediatric Dentistry, 2014. Guidelines on pulp therapy for primary and young permanent teeth. *Pediatr Dent.,* 36(6): 242–50.

Aylard SR, Johnson R. 1987. Assessment of filling techniques for primary teeth. *Pediatr.,* 9: 195-198.

Bawazir OA, Salama FS. 2006. Clinical evaluation of root canal obturation methods in primary teeth. *Pediatr Dent.,* 28(1): 39–47.

Bhandari SK, Prajapati U. 2012. Root canal obturation of primary teeth: Disposable injection technique. *J Indian Soc Pedod Prev Dent.,* 30(1): 13.

Coll J, Sadrian R. 1996. Predicting pulpectomy success and its relationship to exfoliation and succedaneous dentition. *Pediatr Dent.,* 18: 57–63.

Dandashi MB, Nazif MM, Zullo T, Elliott MA, Schneider LG, Czonstkowsky M. 1993. An in vitro comparison of three endodontic techniques for primary incisors. *Pediatr Dent.,* 15: 254–256.

Fuks A, Eidelman E, Pauker. 2002. Root fillings with Endoflas in primary teeth: retrospective study. *J Clin Pediatr Dent.,* 27: 4–6.

Grossman LI. 1981. Endodontic practice. 10th ed. Philadelphia:Lea & Febiger, p. 310-l.

Grover R, Mehra M, Pandit I, Srivastava N, Gugnani N, Gupta M. 2013. Clinical efficacy of various root canal obturating methods in primary teeth: a comparative study. *Eur J Paediatr Dent.,* 14(2): 104–108.

Guelmann M, McEachern M, Turner C. 2004. Pulpectomies in primary incisors using three delivery systems: an in vitro study. *J Clin Pediatr Dent.,* 28(4): 323–326.

Hiremath M, Srivastava P. 2016. Comparative evaluation of endodontic pressure syringe, insulin syringe, jiffy tube, and local anesthetic syringe in obturation of primary teeth: An in vitro study. *J Nat Sci Biol Med.,* 7(2): 130.

Jha M, Patil SD, Sevekar S, Jogani V, Shingare P. 2011. Pediatric Obturating Materials And Techniques. *Journal of Contemporary Dentistry.,* 1(2): 27-32.

Johnson MS, Britto LR, Guelmann M. 2006. Impact of a Biological Barrier in Pulpectomies of Primary Molars. *Pediatr Dent.,* 28: 506-510.

Mahajan N, Bansal A. 2015. Various Obturation methods used in deciduous teeth. *Int J Med and Dent Sci.,* 4(1): 708–13.

Memarpour M, Shahidi S, Meshki R. 2013. Comparison of different obturation techniques for primary molars by digital radiography. *Pediatric dentistry.,* 35(3): 236–40.

Moskovitz M, Sammara E, Holan G. 2005. Success rate of root canal treatment in primary molars. *J Dent.,* 33(1): 41–7.

Nagar P, Araali V, Ninawe N. 2011. An alternative obturating technique using insulin syringe delivery system to traditional reamer-an in-vivo study. *Journal of Dentistry and Oral Biosciences*, 2: 7-9.

Parikh A, Banga K, Thakore A. 2000. Bi-directional spiral compared to traditional sealer placement techniques. *Endodontology*., 12(2): 59–64.

Praveen P, Anantharaj A, Venkataraghavan K. 2011. A review of obturating materials for primary teeth.2011. SRM *Journal of Research in Dental Sciences.,* 2(1): 42.

Ramar K, Murgara J. 2010. Clinical and radiographic evaluation of Pulpectomies using three root canal fi lling materials: An in-vivo study. *J Indian Soc Pedod Prevent Dent.*, 28(1): 259.

Rewal N, Thakur A, Sachdev V, Mahajan N. 2014. Comparison of Endoflas and Zinc oxide Eugenol as root canal filling materials in primary dentition. *J Indian Soc Pedod Prev Dent.,* 32(4): 317.

Simcock RM, Hicks ML. 2006. Delivery of Calcium Hydroxide: Comparison of Four Filling Techniques. *J Endod.,* 32(7): 680–2.

Subba Reddy V, Shakunthala B. 1997. Comparative assessment of three obturating techniques in primary molars: An in-vivo study. *Endodontology.,* 9: 13-6.

Sunitha B, Kiran K, Puppala R, Kethineni B, Ravigna, Dandotikar D. 2014. Resorption of Extruded Obturating Material in Primary Teeth. *Indian Journal of Mednodent and Allied Sciences.,* 2(1): 64.

Torres CP, Apicella MJ, Yancich PP, Parker MH. 2004. Intracanal placement of calcium hydroxide: a comparison of techniques, revisited. *J Endod.,* 30(4): 225–227.

Vashista K, Sandhu M, Sachdev V. 2015. Comparative Evaluation of Obturating Techniques in Primary Teeth: An in vivo Study. Marwah N, editor. *Int J Clin Pediatr Dent.,* 8: 176–80.

****