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Clinical And Radiographic Correlation with Obturation Quality in Pulpectomized: An In Vivo Study.

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Abstract

Aim: To compare and evaluate the clinical and radiographic success of four different zinc-oxide integrated root canal obturating materials.

Materials and Methods: A total of 150 infected primary mandibular molars were randomly and equally divided into three subgroups (*n* = 50 each): Group 1 (ZoE), Group 2 (Metapex), and Group 3 (Endoflas) based on the obturation material preferred. The teeth were clinically and radiographically evaluated at 6 and 12 months' postoperatively by another investigator who was blinded to the type of filling material that was used in each tooth. Kruskal–Wallis test, Mann–Whitney Test, and Wilcoxon Signed-Rank Test was used for statistical analysis.

Results: Zinc oxide eugenol had 100 % overall success rate, followed by endoflas with 98.6% and met apex with 92.1%. Intergroup comparison of overall success was statistically significant (p = 0.0027).

Conclusion: Both zinc oxide eugenol and endoflas showed 100% clinical success rate at 3- and 6-months interval. Metapex showed 100 % clinical success at the 3rd month, but it declined to 89.4 % in the 6th month follow up. Similar, inter group comparisons of clinical success between the three groups was highly statistically significant at the 6th month interval (p <0.001).

Keywords: Endoflas, Root, Canal, ZoE.

Introduction

Dental caries is a disease of modern civilization and despite of great achievements in oral health of populations it is still a major oral health problem in most industrialized countries, affecting 60-90% of school children leading to early loss of primary teeth. The most common cause of premature loss of primary teeth is dental caries leading to involvement of pulp and peri radicular tissue causing pain and infection. Premature loss of primary teeth may result in space loss leading to crowding, ectopic eruption of permanent teeth, speech

defects, development of deleterious oral habits and masticatory problems thus affecting normal growth and development of orofacial region. Following premature loss of primary teeth maintaining the integrity of the primary dentition until its normal exfoliation is a major goal of Paediatric dentistry which is aimed at restoring the normal occlusal function, esthetics, and normal facia-maxillary growth.

The infected non vital primary teeth with or without periapical pathology can be successfully treated by pulpectomy procedures.[4] Different techniques and materials have been advocated for obturation of pulpectomized root canals of the primary teeth. An ideal obturating technique should ensure complete filling of the canal without overfill and with minimal or no voids.

Considering above facts, the present study was designed to assess and compare the success of Endoflas and ZOE as obturating material clinically and radiographically by employing 3 different obturation techniques using Endodontic Pressure syringe, Past inject system, Navi Tip syringe.

Methodology

A total of 150 infected primary mandibular molars were randomly and equally divided into three subgroups (n = 50 each): Group 1 (ZoE), Group 2 (Metapex), and Group 3 (Endoflas) based on the obturation material preferred. The teeth were clinically and radiographically evaluated at 6 and 12 months' postoperatively by another investigator who was blinded to the type of filling material that was used in each tooth. Kruskal–Wallis test, Mann–Whitney Test, and Wilcoxon Signed-Rank Test was used for statistical analysis.

Inclusion criteria

1. Presence of gingival abscess or sinus tract
2. Tooth that has been planned for pulpotomy and excessive haemorrhage is encountered following amputation of coronal pulp
3. Presence of inter-radicular or periapical radiolucency
4. Tooth having adequate bone support with at least two third intact root length.

Exclusion criteria

1. Grossly decayed unrestorable tooth
2. Tooth with evidence of any internal or external pathological root resorption .

Clinical Procedure

All pulpectomy procedures followed same standardized protocol and done by a single operator. After anaesthetizing and proper isolation access opening was carried out using a large round bur. The roof of the pulp chamber was removed with a no. 330 tungsten-carbide bur in high-speed hand piece. Alkanalswerechec ked radio graphically for apical patency and root canal conditions by inserting a no. 10 K-file (Mani Co, Tokyo, Japan). First the working length was recorded as the length of the initial file at the apical foramen minus 1mm. After obtaining working length chemo-mechanical debridement with selective filing was done sequentially up to maximum size of 35 or 40 K-file (ManiCo. Tokyo, Japan) in a pull-back direction. The root canal preparation was aided with copious irrigation with 3% NaOCl (Par can, Septodont Healthcare India Pvt. Ltd India) and normal saline. After bio mechanical preparation all the root canals were irrigated with normal saline.

Criteria For Clinical Evaluation

All the samples were subjected to clinical evaluation pre-operatively and post-operative 3, 6 and 9 months follow up by following criteria.

1. Presence or absence of spontaneous pain
2. Presence or absence of tender on percussion

3. Presence or absence of gingival swelling
4. Presence or absence of draining sinus/fistula

Scoring criteria for Clinical Evaluation

- Score 0: symptoms absent
- Score 1: symptoms present

Criteria For Radiographic Evaluation

Reduction or absence of pre-existing pathological furcal radiolucency

- Score 0: decreased size of furcal radiolucency
- Score 1:no change or same size furcal radiolucency
- Score 2: increased size of furcal radiolucency

Endodontic success assessed by quality of obturation and completeness of fill based on the following criteria given by Coll and Sadrian (1996).[10]

Quality of obturation is determined by level of obturation scored assistance from working length.

Score 1 (Underfilling):All canals filled more than 2 mm short of root apex

Score 2 (Optimal filling): One or more canals having obturating material ending at the radiographic apex or up to 2 mm short of apex.

Score 3 (Over filling):Any canal showing obturating material beyond the radiographic apex

Completeness of fill in each third (apical, middle, and coronal) of the canal.

scored as presence or absence of voids

Score 0: voids absent

Score 1: voids present

All the radiographic assessment was recorded for each group and compared at 3,6 and 9 months follow up visits.

To prevent bias clinical and radiographic evaluation were assessed by another investigator and all the results were then subjected to biostatistical analysis by Microsoft excel worksheet (2007) and statistical analysis was done using Statistical Package for Social Sciences, version 20.0 (SPSS, Chicago, IL, USA).

Observations

A total of 90 children (M=47, F=43) with a mean age of 6.40 ± 1.19 years participated in the present study in which pulpectomies were carried out in the mandibular primary second molars demographic distribution of study groups according to age and gender.

Length of obturation was compared among all the techniques for each of the material at each follow up visit. Within ZOE group significant difference was compared among 3 obturation techniques and found to be non-significant. (χ^2= 3.1p = 0.54) A significant difference was found among 3 obturation techniques within the Endoflas group with maximum optimal fillings in group. (χ^2= 15.60p = 0.003).

Maximum voids were seen in 15(50%) cases in group compared to 4(13.33%) cases in group and 9(30.0%) cases in group in coronal third of mesial and distal canals.

Discussion

Pulpectomy is an endodontic procedure to salvage the primary teeth when pulp becomes irreversibly infected or necrotic due to caries, trauma, or other causes. The rationale of this treatment is near total elimination of microorganism from the root canal and prevention of subsequent reinfection.

Since 1930's Zinc oxide Eugenol is one of the most widely used materials for root canal filling of primary teeth. Despite having certain disadvantages like slow resorption, irritation to the periapical tissues, necrosis of bone and cementum and altering the path of eruption of succedaneous tooth, high success rates have been reported after obturating with Zinc Oxide Eugenol cement in previous studies.

In the present study, ZOE paste (Endo met® Plain, Septodont Healthcare India Pvt Ltd, Maharashtra, India) was used as one of the obturating material because of its easy availability and cost-effectiveness as compared to any other filling material used. Endoflas (Sanlor Laboratories, Miami, FL, USA) being another successful material available was also included in the present study.

Along with the composition and mixing of obturating materials the various technique of obturating the primary root canals play a major role in the success of the pulpectomy procedure. Various techniques for the obturation of primary teeth have been tried clinically to achieve these goals namely; Endodontic pressure syringe, Mechanical syringe, Tuberculin syringe, Jiffy tube, Incremental filling technique, Endodontic plugger, Navi Tip and Lentulo spiral technique.

On the other hand, Endodontic pressure syringe is one of the novel traditional techniques of delivering the desired material into the root canal that consists of a syringe barrel, threaded plugger, wrench and threaded needle. Recently, a thin and flexible metal tip was introduced viz., Navi Tip (Ultra dent products Inc; South Jordan, Utah, USA) to deliver root canal sealer and available in different lengths with reported success rate in previous studies.

A need has always persisted to evaluate the optimum technique of obturation of primary teeth, so as to obtain a compact and dense filling of the root canal. Hence, the purpose of this study was to compare the efficiency of Endodontic pressure syringe with Navi Tip and Pastinject as obturation techniques using ZOE or Endoflas as obturating material in primary teeth.

In the present study, all the pulpectomized teeth were evaluated clinically for spontaneous pain, tenderness on percussion, gingival swelling and draining sinus or fistula preoperatively and post-operatively at 3, 6 and 9 months follow up.

Conclusion

Among all the materials, Endoflas showed the highest success rate with least incidence of resorption both outside and within the root canal whereas least success rate was observed with Metapex (Hollow-Tube Effect). The success of pulpectomy was related to the amount of preoperative root resorption. Teeth with excess resorption had significantly lower success rate than teeth without any or minimal preoperative root resorption.

Based upon the radiographic assessment, it was observed that both Endodontic pressure syringe and Pastinject gave maximum number of optimal obturations. We found that pressure syringe gave a compact filling but it was time consuming. On the other hand, Past inject was easy to use. Considering above facts, in the present study Pastinject system along with Endoflas or ZOE obturating material was found to have maximum optimal fillings.

References

1. Barja-Fidalgo F, Moutinho-Ribeiro M, Oliveira MA, de Oliveira BH. A systematic review of root canal filling materials for deciduous teeth: Is there an alternative for zinc oxide-eugenol? ISRN Dent. 2011;2011:367318.

2. Barcelos R, Santos MP, Primo LG, Luiz RR, Maia LC. ZOE paste pulpectomies outcome in primary teeth: A systematic review. J Clin Pediatr Dent. 2011;35:241–8.

3. Sadrian R, Coll JA. A long-term followup on the retention rate of zinc oxide eugenol filler after primary tooth pulpectomy. Pediatr Dent. 1993;15:249–53

4. Petersen PE. The World Oral Health Report 2003:Continuous improvement of oral health in the 21st century: approach of the WHO Global Oral Health

Programme. Community Dent Oral Epidemiol, 2003; 31 (Suppl1):3–24.

5. Cohen M, Burns RC. Pathways of pulp, 8th ed. St. Louis: Mosby Inc; 2002.

6. Finn SB. Clinical Pedodontics, 4thed. Philadelphia: W.B. Saunders Company; 1995.

7. McDonald RE, Avery RA, Dean JA. Dentistry for the child and adolescent. 7th ed. St. Louis, CV Mosby; 2000.

8. Aylward SR, Johnson R. Assessment of filling techniques for primary teeth. Pediatric Dentistry 1987; 9 (3):195-8.

9. Dan dashi MB, Nazif MM, Zullo T, Elliott MA, Schneider LG, Czonstkowsky M. An in vitro com parison of three endodontic techniques for primary incisors. Pediatric Dentistry 1993; 15(4):254-6.

10. Deveraux E, Dufour D, Boniface B. Five methods of calcium hydroxide intracanal placement: An in vitro evaluation. Oral Surgery Oral Medicine Oral Pathology 2000; 89(3):349-55.

11. Coll JA, Sadrian R. Predicting pulpectomy success and its relationship to exfoliation and succedaneous dentition. Pediatr Dent 1996; 18(1):57- 63.

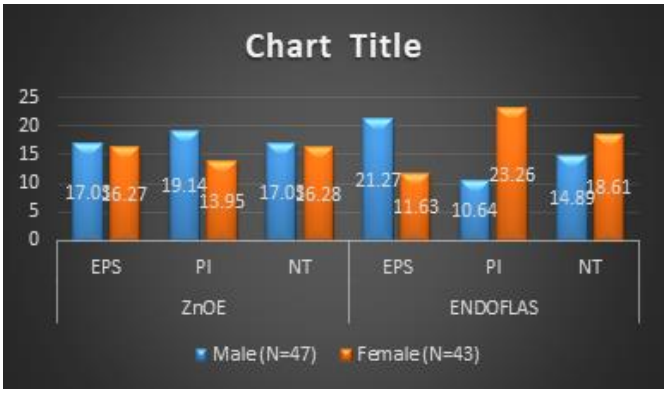
12. Barr ES, Flaitz CM, Hicks JM. A retro spective radio graphic evaluation of primary molar pulpectomies. Pediatr Dent 1991; 13(1): 4-9.

13. Gould JM. Root canal therapy for infected primary molar teeth: preliminary report. J Dent Child 1972; 39:269-73.

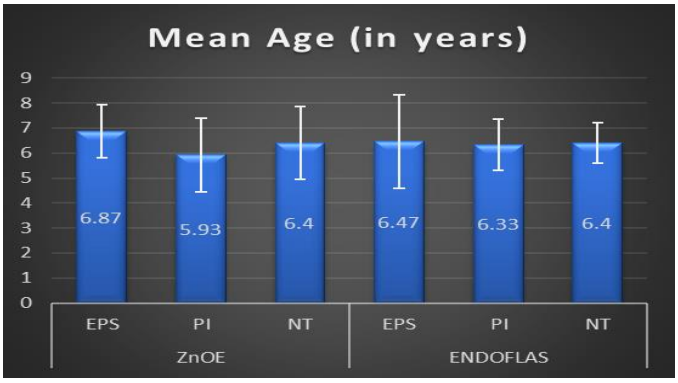
14. Oztan MD, Akman A, Dalat D. Intracanal place ment of calcium hydroxide: A comparison of two different mixtures and carriers. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2002; 94(1): 93-7.

15. Guelmann M, McEachern M, Turner C. Pulpectomies in primary incisors using three delivery systems: an in vitro study. The Journal of Clinical Pediatric Dentistry 2004;28(4): 323-6.

Legend Figures and Tables



Graph 1: Gender distribution of samples according to obturation techniques.



Graph 2: Age distribution of study participants (Mean ± Standard Deviation) according to obturation materials.

Obturation material	Number of children	Number of teeth treated
Zinc oxide eugenol (Group A)	14	20
Metapex (Group B)	12	20
Endoflas (Group C)	10	20
Total	36	60

Table 1: Sample distribution based on number of children and number of teeth treated.

Variable	Material	Score	EPS	PI	NT	χ^2	p
Length of Obturation	Zn OE	1	2(13.3)	1(6.7)	1(6.6)	3.1	0.54
		2	8(53.3)	11(73.3)	7(46.7))		
		3	5(33.3)	3(20)	7(46.7)		
	End of	1	1(6.6)	1(6.7)	6(40)	15.60	0.003*
		2	4(26.7)	11(73.3)	5(33.3)		
		3	10(66.7)	3(20)	4(26.7)		

Table 2: Comparison of Length of Obturation score among three obturation techniques using two different obturating materials.

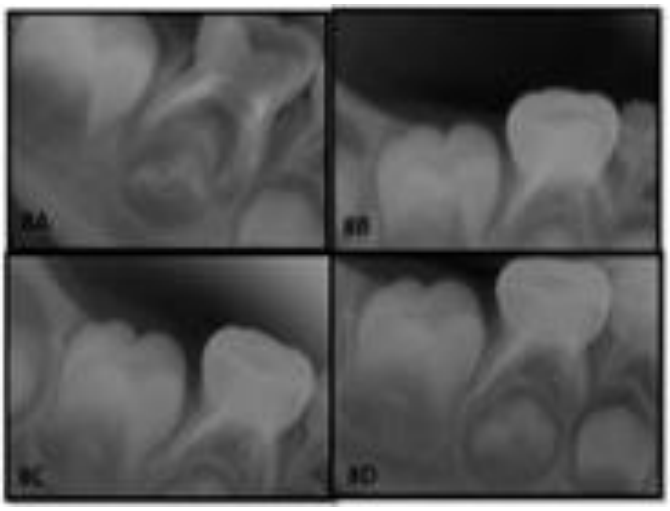


Figure 1: Radiographic assessment of root resorption after 12 months in pulpectomized deciduous teeth with Zinc-Oxide Eugenol as an obturation material