

To Compare Different Obturating System in Primary Molars: In-Vitro Study

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ABSTRACT

Background: The complete debridement of primary teeth is very difficult because of canal morphology and the proximity of the succedaneous tooth. Therefore, the obturating material should be biocompatible and eliminate these residual pathogens. The present study was conducted to compare the different obturating systems in primary teeth.

Material and methods: The present study was conducted among children attending the department of pedodontics and preventive dentistry and those attending as a part of school dental health programs. 80 Healthy children with at least one primary anterior tooth in mandibular arch indicated for pulpectomy of age 5-9 years were included in the study. The clinical procedure was explained to the parent or guardian. Pulpectomy was performed in all teeth indicated for pulp therapy. Based on technique of obturation, patients were divided into two groups. Group I: forty teeth obturated with lentulospiral technique. Group II: forty teeth obturated with pressure syringe. The comparison among the two techniques was determined radiographically by evaluating quality of obturation and voids in the obturated canals. Assessment of radiographs was done by different examiner who was unaware of the technique used for the obturation. Statistical Analysis Data collected were statistically analysed using SPSS 21 software. Chi-square test was applied to compare the obturating techniques.

Results: In the present study total sample size was 80 in which group I(n=40) was obturated with lentulospiral and Group II(n=40) was obturated with pressure syringe. In Group I 10% were underfilled, 70% teeth were optimal filled and 20% teeth were overfilled. Voids were present in 52.5% teeth. In group II 17.5% were underfilled, 55% teeth were optimal filled and 27.5% teeth were overfilled. Voids were present in 22.5% teeth.

Conclusion: Our study concluded that canals obturated with lentulospiral were maximum optimally filled. But voids in obturation was less with pressure syringe.

Keywords: Oobturation, underfilled, lentulospiral, pressure syringe.

INTRODUCTION

Pulpectomy is a root canal procedure for the complete pulp tissue that is irreversibly infected or necrotic due to caries or trauma. Infected teeth should be treated and maintained in the dental arch as natural space maintainers, providing that they can be restored to function and remain free from the disease.¹ Due to the challenging task of complete debridement related to canal morphology and the proximity of the succedaneous tooth, the obturating

material should be biocompatible and eliminate these residual pathogens.² The methods selected by the practitioners to fill the pulpectomized canals of primary teeth are numerous and varied. The obturation materials can be carried to the pulp chamber and canals by a lentulospiral, can be placed in bulk and pushed into the canals with an endodontic plugger or with a cotton pellet, and they can also be applied by using an endodontic pressure

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syringe.³ The other most common techniques for the delivery of obturating material to the apex of pulpectomized primary teeth include using amalgam pluggers, mechanical syringe, jiffy tube, tuberculin syringe.⁴ The aim of the present study was to compare the different obturating systems in primary teeth.

MATERIAL AND METHODS

The present study was conducted among children attending the department of pedodontics and preventive dentistry and those attending as a part of school dental health programs. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and informed consent was obtained from the ethical committee. 80 Healthy children with at least one primary anterior teeth in mandibular arch indicated for pulpectomy of age 5-9 years were included in the study. Only healthy children with Frankl's behavioral rating scale (4) were included in the study. Primary mandibular molar teeth with at least two-thirds of root length and absence of external or internal pathological root resorption or radiolucent area in the furcation or periapical region were included in the study. Nonrestorable tooth, tooth with pathological lesion extending to the successor tooth germ, tooth with evidence of external and internal root resorption were excluded from the study. The clinical procedure was explained to the parent or guardian. Pulpectomy was performed in all teeth indicated for pulp therapy. Based on technique of obturation, patients were divided into two groups. Group I: forty teeth obturated with lentulospiral technique. Group II: forty teeth obturated with pressure syringe. A standard preoperative radiograph was taken using conventional bisecting angle technique. Access to the pulp was obtained by round bur and barbed broach was used to remove it. The working length of the canal was established 1 mm short of radiographic apex. Biomechanical preparation of root canal was done and the canal was irrigated using saline and dried using paper points. Obturation of the tooth was then done using either lentulospiral technique or pressure syringe technique, and the teeth were divided in groups I and II, respectively.

Obturation In Group I: A fine lentulospiral instrument was measured to 1 mm short of the

predetermined canal length. The mixing ratio of zinc oxide and eugenol was two scoops of powder and two drops of liquid. The lentulospiral was dipped into the mixture, then introduced into the canal to its predetermined length and rotated into the canal. Additional amounts of paste were gradually introduced until the canal was filled. A radiograph was then taken for evaluation. **Obturation in Group II:** A 22-gauge pressure syringe needle was selected and prefitted in the canal, with the length of the needle equaling 2 mm short of the predetermined canal length. The needle was placed in the prepared root canal to its previously observed depth. During continued filling of the canal with additional paste, the needle was withdrawn slightly to break contact with the side walls of the canals. This was followed by a radiograph for evaluation of obturation.

The comparison among the two techniques was determined radiographically by evaluating quality of obturation and voids in the obturated canals, based on the following criteria given by Coll and Sadrian (1996)⁵:

- Under filling (Score 1): All the canals were filled more than 2 mm short of the apex.
- Optimal filling (Score 2): One or more of the canals having obturating material ending at the radiographic apex or upto 2 mm short of the apex.
- Over filling (Score 3): Any canal showing obturating material extending beyond the radiographic apex.
- Voids: Obturated canals showing voids (presence/absence).

All the pulpectomies were completed and postoperative radiograph were taken immediately after the procedure. Assessment of radiographs was done by different examiner who was unaware of the technique used for the obturation. Statistical Analysis Data collected were statistically analyzed using SPSS 21 software. Chi-square test was applied to compare the obturating techniques.

RESULTS

In the present study total sample size was 80 in which group I(n=40) was obturated with

lentulospiral and Group II(n=40) was obturated with pressure syringe. In Group I 10% were underfilled, 70% teeth were optimal filled and 20% teeth were overfilled. Voids were present in 52.5%
Table 1: Distribution of data.

teeth. In group II 17.5% were underfilled, 55% teeth were optimal filled and 27.5% teeth were overfilled. Voids were present in 22.5% teeth.

Groups	Quality of filling			Distribution of voids	
	Underfilling	Optimal filling	Overfilling	Absent	Present
Group I (n=40)	4(10%)	28(70%)	8(20%)	19(47.5%)	21(52.5%)
Group II (n=40)	7(17.5%)	22(55%)	11(27.5%)	31(77.5%)	9(22.5%)
P value	<0.005				

DISCUSSION

Due to limited success with biomechanical preparation of the root canal system in primary teeth, overall success rate of pulpectomy procedure depends not only upon the type of obturation material, but also on the filling quality of primary root canals.⁶ In the present study, the ZOE paste was used as obturating material due to its universal usage and low cost, and many investigators have used ZOE for assessment.⁷ It has beneficial properties such as the amount of the eugenol released at the periapical zone immediately after placement, i.e., 10^{-4} and falls to 10^{-6} after 24 h, reaching zero after 1 month. Within these concentrations, eugenol is said to have anti-inflammatory and analgesic properties that are beneficial after a pulpectomy procedure.⁸

In the present study total sample size was 80 in which group I(n=40) was obturated with lentulospiral and Group II(n=40) was obturated with pressure syringe. In Group I 10% were underfilled, 70% teeth were optimal filled and 20% teeth were overfilled. Voids were present in 52.5% teeth. In group II 17.5% were underfilled, 55% teeth were optimal filled and 27.5% teeth were overfilled. Voids were present in 22.5% teeth.

In the present study, more number of overfilled canals were observed with pressure syringe than under filled canals. This might be due to excessive pressure placed while placing the material into the canal, when the quarter turn of the screw was made. In the various studies, pressure syringe was proven to as a better technique for obturation when compared with incremental filling technique, lentulospiral technique.^{5,9}

In the present study, voids were seen with handheld lentulospiral filling technique which could be due to entrapment of air bubbles in the ZOE material possibly due to during mixing of the powder and liquid. Voids can also occur due to repeated removal and reinsertion of the lentulo spiral during root filling procedure or great amount of pressure exerted by operator to fill all the voids.^{10,11}

Aylard and Johnson found that endodontic pressure syringe was superior for filling straight canals and lentulospiral was better for filling curved canals.¹²

CONCLUSION

Our study concluded that canals obturated with lentulospiral were maximum optimally filled. But voids in obturation was less with pressure syringe.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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