



Obturation Techniques in Primary Teeth

Ahsana Asif*, Subramanian EMG

Department of Pediatric and Preventive Dentistry, Saveetha Dental College and Hospitals, Chennai, Tamil Nadu, India



Article History:

Received on: 20 Jul 2020
Revised on: 18 Aug 2020
Accepted on: 10 Sep 2020

Keywords:

Obturation Techniques,
Pulpectomy,
Primary teeth

ABSTRACT

Dental caries is a global concern affecting children and adults. A pulpectomy is considered to be the treatment of choice to preserve the pulpally involved primary teeth. Among the various factors determining the clinical success of pulpectomy, proper obturation of the root canals plays an important role. Different obturation materials are being used for the obturation of the primary teeth root canal, which includes zinc oxide eugenol, calcium hydroxide, calcium hydroxide iodoform paste and combinations. These materials are available in different forms such as powder, powder and liquid, paste forms. Various techniques are available to introduce the obturation materials into the root canal systems. These techniques have been tried to create a three-dimensional fluid-tight seal of the root canals. This review article aims to highlight the different techniques that are being used for the obturation of primary teeth. Each technique has its advantages and disadvantages. Creation of voids within the obturation, underfilling or overfilling are the common problems that can be encountered during root canal obturation. These factors can compromise the clinical and radiographic success of pulpectomy treatment. With the current evidence, no definitive conclusions can be made to decide which is the best obturation technique in terms of clinical and radiographic success. The choice of technique selection depends on the clinician's preference, cost-effectiveness, time consumption, ease of handling.

*Corresponding Author

Name: Ahsana Asif
Phone: 9176543653
Email: ahsanaasif93@gmail.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11i4.3254>

Production and Hosted by

IJRPS | www.ijrps.com

© 2020 | All rights reserved.

INTRODUCTION

One of the primary concern in the field of Paediatric dentistry is the early loss of primary teeth. Premature loss of primary teeth results in space loss which affects the integrity of oral tissues, swallowing, mastication and speech (Fuks, 2000). A pulpectomy is

considered to be the ideal treatment to preserve the primary teeth with pulpal involvement (Rodd *et al.*, 2006).

A pulpectomy is the process of complete removal of the pulp from the root canals of the primary teeth and filling them with an inert resorbable material for maintaining the tooth in the dental arch till the time of their exfoliation (Fuks, 2008).

The characteristic features of ideal pulpectomy (Lin *et al.*, 2006) includes,

1. The simple and fast technique,
2. Reduced treatment time
3. Lesser number of appointments
4. Thorough cleaning and debriding of the infected root canals without damaging the underlying permanent tooth bud/tooth

5. Three-dimensional hermetic seal of the root canal system
6. Few procedural complications
7. The ability of the treated tooth to restore or maintain the function

The three-dimensional hermetic seal of the root canal system is an essential factor that determines the success of pulpectomy. It affects microleakage and cuts off the nutrient supply to any surviving microorganism and prevents the entry of bacterial products into the periapical tissues (Singh *et al.*, 2017).

There are several techniques available in the literature that have been used for introducing obturating material into the root canal. The ultimate goal of any obturation technique is to obtain a complete filling of the root canals from the canal orifice until the root apex with minimal or no voids (Guelmann *et al.*, 2004). Also, the obturation technique should be easy to use, less time consuming and should have a consistent result (Sevekar *et al.*, 2011).

Different Obturation Techniques

Endodontic Pressure Syringe

The Endodontic pressure syringe apparatus consists of a syringe barrel, threaded plunger, wrench and threaded needle. The pressure syringe acts by a screw mechanism. The needle is inserted into the root canal until the resistance is obtained. A slow, withdrawing-type of motion with a quarter turn at 3 mm intervals was used until the canal is visibly filled at the orifice (Aylard and Johnson, 1987). As the needles are flexible, it can be used in the tortuous canals (Sevekar *et al.*, 2011). Overfilled obturation is common with pressure syringe.

In the study by Hiremath and Srivastava, endodontic pressure syringe performed the best with a maximum number of optimal fillings compared to insulin syringe, jiffy tube, and local anaesthetic syringe (Hiremath and Srivastava, 2016). Aylard and Johnson reported significantly better results with endodontic pressure syringe when compared with the mechanical syringe for obturating the curved root canals (Aylard and Johnson, 1987). Practical difficulties in adjusting the rubber stopper and need to clean the syringe immediately after every use make this method complex and time-consuming (Memarpour *et al.*, 2013).

Mechanical Syringe

This technique introduced by Greenberg in 1971, utilizes a plunger system. This technique showed

poor performance in both curved and straight canals (Aylard and Johnson, 1987).

Tuberculin Syringe

In 1987, Aylord and Johnson used Tuberculin syringe for the obturation of the root canal. 26-gauge, the 3/8-inch needle was used, and a slow finger pressure was applied onto the plunger to express the material into the canal (Aylard and Johnson, 1987). The wet cotton pellet was recommended to gently push the filling materials into the root canals (Sevekar *et al.*, 2011). Tuberculin syringe group produced poor results in primary molar teeth obturation (Memarpour *et al.*, 2013).

Needle separation during injection of the material was the main drawback of this technique. This necessitated the need for replacing the needle repeatedly leading to the formation of voids (Memarpour *et al.*, 2013).

Insulin Syringe Technique

This technique was first described by (Priya, 2011). The needle is inserted into the canal and is kept 2mm short of apex. The material is expressed into the canal, as the needle is gradually retrieved, thereby avoiding voids. Addition of more material was done by placing the material over the orifice and is compressed using wet cotton. Optimal filling with less number of voids can be achieved with optimum operator skills and proper material mix (Priya, 2011). Akhil *et al.* (2019) stated that insulin syringe produced least voids when compared to endodontic plugger and lentulo spiral.

Disposable Injection Technique

This technique utilizes 2-ml syringe and 24-gauge needle—a stopper adjusted to measured working length. The material is expressed into the root canal similar to insulin syringe technique. This technique is considered to be cost-effective and straightforward (Bhandari *et al.*, 2012).

NaviTip

NaviTips, introduced by Ultradent, is a thin and flexible metal tip used to deliver sealers into the root canals. Guelmann *et al.* (2004) stated that NaviTips offered more desirable obturation than the obturation with a syringe with plastic needle (Vitapex), lentulo spirals. Memarpour *et al.* (2013) concluded that NaviTip produced the best results. NaviTips showed poor results when compared to Endodontic Plugger and lentulo spirals when Endoflas was used (Pandranki *et al.*, 2017). Khubchandani reported that Navitip controlled voids production and produced the best apical seal (Khubchandani *et al.*, 2017).

Endodontic Plugger

Gould first used the technique of using endodontic plugger for obturation of primary teeth in 1972, and the technique is called an Incremental filling technique. An endodontic plugger, to the size of the previously used file, was used. The rubber stopper is adjusted 2mm short of the apex. Additional increments were added until the canal is filled until the cervical area (Dandashi *et al.*, 1993). The disadvantage of Endodontic plugger is its limited flexibility, and it does not produce good obturation in narrow and curved canals. Also, repeated insertion of the instrument can lead to large voids. Memarpour *et al.* (2013) also found that packing with plugger causes more voids.

Reamer

A reamer is inserted into the root canal using a vibratory motion with clockwise rotation. It is then withdrawn from the canal while continuing the clockwise motion. A rubber stopper was adjusted at the predetermined working length. The process was repeated until the canal orifice appeared filled with the paste. The results were similar to that produced with an insulin syringe (Priya, 2011).

Jiffy Tube

Rifficin in 1980 popularized the technique of using Jiffy tube. The tip is placed into the canal orifice, and a downward squeezing motion is used to express the material until the orifice appears to be filled (Aylard and Johnson, 1987).

PastInject

PastInject (MicroMega, France) has flattened blades, thereby facilitating easy and effective placement of material into the root canal. Grover *et al.* (2013) found that PastInject was more comfortable to be used and produced good results of maximum optimally filled canals and with minimal voids.

Lentulospiral

Kopel in 1970 popularized the technique of obturation using Lentulospiral. Aylard and Johnson (1987); Dandashi *et al.* (1993) concluded that the engine-driven lentulo spiral produced best results and there was no significant difference between the lentulo spiral and the pressure syringe when used in straight canals. For filling of the apical canal, lentulo spiral at 15000 rpm and for filling of apical and the middle third, lentulo spiral at 5000 rpm was suggested (Deonizio *et al.*, 2011). There was no statistically significant difference between the engine-driven lentulo spiral and hand-held lentulo spiral. Highest optimally filled canals were observed in a lentulo spiral when compared to endodontic plugger and insulin syringe (Akhil *et al.*, 2019).

Hand-held lentulo spiral showed maximum post obturation volume followed by engine-driven lentulo spiral (Nagaveni *et al.*, 2017). Effective in obturation of narrow and curved canals due to flexibility of the Lentulospiral. Instrument fracture, over obturation and difficulties in adjusting the rubber stops, are the major disadvantages of using this technique. (Memarpour *et al.*, 2013)

Bi-Directional Spiral

Dr. Barry Musikant introduced the bidirectional spiral in 1998. Spirals at the coronal end push the material towards the apex and the spirals at the apical end towards the coronal end. At the junction, the material is thrown out laterally. This controls the extrusion of the material beyond the apex. Bidirectional spiral produces a considerable number of voids (Grover *et al.*, 2013). Bi-directional spiral and lentulo spiral produced better results than incremental technique, and past injects and the bi-directional spiral was superior to lentulo spiral in the prevention of over obturation (Chandrakhar *et al.*, 2018).

CONCLUSIONS

There are different obturation techniques available, each with their pros and cons. Clinician's preference can vary based on cost-effectiveness, time consumption, ease of handling. Therefore, no definitive conclusions can be made to decide which is the best obturation technique.

ACKNOWLEDGEMENT

Taken from Institutional Review Board, Saveetha Dental College and Hospitals, Chennai, India (IHEC/SDC-PEDO1703/19/024)

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

- Akhil, J. E. J., Prashant, B., Shashibushan, K. K. 2019. Comparative evaluation of three obturation techniques in primary incisors using digital intra-oral receptor and C.B.C.T—an in vitro study. *Clinical Oral Investigations*, 23(2):689–696.
- Aylard, S. R., Johnson, R. 1987. Assessment of filling techniques for primary teeth. *Pediatr Dent*,

- 9(3):195-198.
- Bhandari, S. K., Prajapati, U., Anita 2012. Root canal obturation of primary teeth: Disposable injection technique. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 30(1):13.
- Chandrasekhar, S., Prasad, M., Radhakrishna, A., Saujanya, K., Raviteja, N., Deepthi, B., Ramakrishna, J. 2018. A comparative In vivo efficacy of three spiral techniques versus incremental technique in obturating primary teeth. *Journal of the Indian Society of Pedodontics and Preventive Dentistry*, 36(1):71.
- Dandashi, M. B., Nazif, M. M., Zullo, T., Elliott, M. A., Schneider, L. G., Czonstkowsky, M. 1993. An in vitro comparison of three endodontic techniques for primary incisors. *Pediatric dentistry*, 15:253.
- Deonízio, M. D., Sydney, G. B., Batista, A., Estrela, C. 2011. Root canal filling with calcium hydroxide paste using lentullo spiral at different speeds. *Dental Press Endodontics*, 1(1):58-63.
- Fuks, A. B. 2000. Pulp therapy for the primary and young permanent dentitions. *Dental Clinics of North America*, 44(3):571-96.
- Fuks, A. B. 2008. Vital Pulp Therapy with New Materials for Primary Teeth: New Directions and Treatment Perspectives. *Journal of Endodontics*, 34(7):S18-S24.
- Grover, R., Mehra, M., Pandit, I. K., 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. *Journal of Clinical Pediatric Dentistry*, 28(4):323-326.
- Hiremath, M. C., 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. *Journal of Natural Science, Biology and Medicine*, 7(2):130.
- Khubchandani, M., Baliga, M. S., Rawlani, S. S., Rawlani, S. M., Khubchandani, K. M., Thosar, N. 2017. Comparative evaluation of different obturation techniques in primary molars: An in vivo study. *European Journal of General Dentistry*, 6(1):42.
- Lin, C. P., Li, U. M., Guo, M. K. 2006. Application of Ni-Ti rotary files for pulpectomy in primary molars. *J Dent*, 1(1):10.
- Memarpour, M., Shahidi, S., Meshki, R. 2013. Comparison of different obturation techniques for primary molars by digital radiography. *Pediatric dentistry*, 35(3):236-240.
- Nagaveni, N. B., Yadav, S., Poornima, P., Bharath, K. P., Mathew, M. G., Kumar, P. N. 2017. Volumetric evaluation of various obturation techniques in primary teeth using cone beam computed tomography - An in vitro study. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 35(3):244.
- Pandranki, J., Chitturi, R. R., Vanga, N. R. V., Chandrabhatla, S. K. 2017. A comparative assessment of different techniques for obturation with endoflas in primary molars: An In vivo Study. *Indian Journal of Dental Research*, 28(1):44.
- Priya, 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(2):7-9.
- Rodd, H. D., Waterhouse, P. J., Fuks, A. B., Fayle, S. A., Moffat, M. A. 2006. Pulp therapy for primary molars. *International Journal of Paediatric Dentistry*, 16(s1):15-23.
- Sevekar, S., Shingare, P., Jogani, V., Jha, M., Patil, S. D. 2011. Pediatric Obturating Materials And Techniques. *Journal of Contemporary Dentistry*, 1(2):27-32.
- Singh, A., Gupta, N., Agarwal, N., Kumar, D., Anand, A. 2017. A comparative volumetric evaluation of four obturating techniques in primary teeth using cone beam computed tomography. *Pediatric Dentistry*, 39(2):11-16.