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Different Obturating Technique Used in Primary Teeth: A Review

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ABSTRACT

Primary teeth maintain the arch length and form by maintaining proper guidance for permanent teeth. Pulpectomy is the one of the treatment option available to preserve the tooth and thus helps in maintaining normal space maintainers. Other objectives of preserving primary teeth are to enhance esthetics and mastication, prevent aberrant tongue habits, aid in speech, and prevent the psychological effects associated with tooth loss. Obturation with hermatic seal is the key for long term success of pulpectomy. Obturation technique that fulfill criteria's for perfect obturation should be given emphasis. However different obturation techniques give different outcomes. Hence the purpose of this article is to throw light on different obturation technique with their comparison with each other.

Key words: Primary teeth, Children, Endodontic file

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INTRODUCTION

Primary teeth are the treasured property of a baby. In children, milk teeth play a vital position for consuming, phonetics, esthetics and additionally as a space maintainer for permanent teeth.1 this goal can be achieved by vital and non-vital pulp therapy procedures. In vital tooth therapy coronal portion of the pulp is removed whereas in nonvital or irreversible pulpitis cases complete pulp is removed followed by placement of suitable material inside the canal.2 ultimately pulpectomy with hermatic seal is the ideal way to prevent primary teeth. Hermatic seal can be achieved by good biomechanical preparation, type of obturating material used and with minimum voids. One of the important causes of pulpectomy failure is percolation of fluids from incomplete obturations, which acts as a base for growth of microorganisms or localization of bacteria in such dead spaces leading to subsequent sequelae of inflammation. So, the great emphasis needs to be placed on root canal filling materials as well as the technique of obturation. Obturation should be done by almost ideal material with technique that is best suited. However obturation depends on Cost effectiveness of carrier which is used to carry the material to the canal, ease of obturation, control and manipulation of material for successful outcome. Commonly used techniques for obturation of primary canals are conventional manual incremental lateral condensation by tuberculin syringe, amalgam pluggers, navi tip, disposable injection technique, hand-held, rotary lentulospiral, jiffy tubes, and endodontic pressure syringe, past inject etc… [1-3].

DISCUSSION

Success rate for pulp therapy mostly depends on obturating material and technique used for obturation.4 obturation without voids should be the best outcome for hermatic seal in pulpectomy procedures. Various different techniques have been used to fill the material in root canals of primary teeth.

Different objurgating technique [4,5]

- ✓ Endodontic pressure syringe.
- ✓ Lentulo spiral.
- ✓ Mechanical syringe.
- ✓ Incremental filling technique.
- ✓ Jiffy tube.
- ✓ Tuberculin syringe.
- ✓ Disposable injection technique.
- ✓ Reamer technique.
- ✓ Insulin syringe technique.
- ✓ Navitip.
- ✓ Bi-directional spiral.
- ✓ Pastinject.

Other techniques [6]

- ✓ Amalgam plugger.
- ✓ Paper points.
- ✓ Pluggingaction with wet cotton pellet.

Endodontic pressure syringe

Endodontic pressure syringe was developed by Greenberg et al. In this technique a standardized mixture inserted in canal using a device and creating controlled pressure. This apparatus consists of a syringe barrel, threaded plugger, wrench and threaded needle. The needle was inserted into the canal until wall resistance was encountered. Using a slow, withdrawing-type motion, needle was withdrawn in 3-mm intervals with each quarter turn of the screw until the canal can be visibly filled at the orifice with zinc oxide eugenol paste [7]. The 13 to 30 gauge needle which corresponds to the largest endodontic file can be used to instrument the root canal [8]. Overfill is a common clinical finding in the primary dentition, especially when apical resorption and/ or the paste is applied through a pressure syringe. According to Memarpour et al. [9]. Difficulties in placing the rubber stop correctly and removing the needle 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 however Aylard at al. [10] states that the pressure syringe extrudes the filling material slowly and material flow can be stopped instantly.

Lentulo spiral

Technique developed by kopel et al. found to be very much effective in curved root canals [7], in this technique lentulospiral although there was no significant difference between endodontic pressure syringe and letulospiral technique. Torres et al also concluded similar result stating that calcium hydroxide radiodensity in a curved canal was significantly greater using a Lentulo spiral-only technique [11]. Similar results were reported by Peters et al and Sigurdsson who reported that application with a lentulo spiral was more homogenous than injection of Ca $(OH)_2$ paste [12,13]. Also Deonízio et al reported that the 15,000 rpm speed was more effective in filling the apical third and 5,000 rpm speed was more effective in filling the cervical and middle thirds in their study utilizing lentulospirals at different speeds for filling the root canal with calcium hydroxide paste [14]. Whereas Bawazir et al. [15] states that there was no statistically significant difference between the two techniques of obturation, according to the quality of the root canal filling or success rate flexibility of the Lentulo spiral allow files to carry the paste uniformly throughout the narrow, curved canals in primary molars. Difficulties with fitting the rubber stop, instrument fracture, and a tendency for extrusion beyond the apex, however, are disadvantages of the Lentulo instruments [9].

Mechanical syringe

This method was proposed by greenberg in 1971. The shape of canal governed the technique that can be used for obturation for primary teeth. Study conducted by aylard and johnson showed that mechanical syringe technique showed poor performance for curved and narrow root canals. The screw mechanism of the endodontic pressure syringe would be able to generate far greater pressures than could a plunger system as is seen with the mechanical syringe [7].

The incremental filling technique

This technique developed by gould 1972. Canal size plugger with stopper was used to place thick zinc oxide eugenol paste inside the canal. Length of the endodontic plugger equaled the predetermined root canal length minus 2 mm. Additional increments of 2-mm blocks were added until the canal was filled to the cervical

area [15], in addition O'Riordan et al. described a method of placing the material in bulk and pushing it into the canals with endodontic pluggers [16]. It is difficult to place material in narrow canal than wide open canal. Limited flexibility of plugger limits the working efficiency in narrow and curved canals. In addition, movements of the plugger during paste application may increase the risk of large voids. According to a study conducted by Memarpour et al, an optimal filling result was obtained more frequently with the Lentulo instrument than with the packing technique [9].

Jiffy tube

Zinc oxide eugenol is the material of choice, a slurry was inserted in canal using paper points followed by thick paste using jiffy tube [17]. The standardized mixture of ZOE is back-loaded into the tube. This technique was popularized by Rifficin et al. in 1980 [7].

Tuberculin syringe

A standard 26- gauge, 3/8-inch needle was back loaded with zinc oxide eugenol paste. Slow finger pressure was used on the plugger until the canal visibly filled at the orifice [7]. There was no significant difference between mechanical and tuberculin whereas tuberculin was found to be worst for the length of obturation as compared to other technique. the main drawback of the tuberculin syringe technique is the difficulty of separating the tip during injection, which results in the need to repeatedly replace the needle. This may compromise optimal filling and increase the presence of voids in the paste [9].

The reamer technique

Basically it is a technique which involves reamer for insertion of zinc oxide eugenol into the canal. Vibration accompanied by reamer coated with zinc oxide eugenol was used. Rubber stopper was used for proper working length and this process was repeated for 5-7 times. In addition a study was conducted which showed that the obturation quality of both the reamer technique and insulin syringe technique was found to be very closely related [18].

The insulin syringe technique

A homogeneous mixture of Zinc Oxide Eugenol is loaded into the insulin syringe and a stopper is used after assessing the working length of the canal. The needle is inserted into the canal and kept about 2mm short of apex. The material is then pressed into the canal and while doing so the needle is retrieved from the canal outwards while continuing to press the material inside. Finally, over the orifice more material is pressed and compressed using wet cotton [18]. Main difference between insulin and tuberclin syringe is of markings. Insulin syringes (1ml) are of 2 types U 40 & U-100, In U-40 Insulin Syringes markings on the barrel are upto 40 Units. In U-100 markings are upto 100 Units. While in case of 1 ml Tuberculin Syringes the markings are in upto 1 ml [19].

Disposable injection technique

24 gauge needle is used to carry zinc oxide eugenol material in canal with adjusted stopper to working length and the material is gently pushed into the canal till the material is seen flowing out of the canal orifice, after this , needle is gradually withdrawn while pushing the material till the needle reaches the pulp chamber [20].

NAVI TIP

Material insertion mostly depends on material viscosity and the resistance to material flow. Syringe with different internal diameter tips have different amount of flow. To overcome the disadvantages of preceding tips, thin and flexible metal tip was used. It comes in different length and stopper can be adjusted to it. [21] Flexibility is advantageous as tip can penetreate into the curved and narrow canal close to the apex. Paste is injected uniformly which gives a densely filled canal with minimum possible voids [22]. Joseph et al. [23] conducted study for the evaluation of extent of obturation and presence of voids in primary teeth using Rotary lentulospiral, Navi-tip and Navitip with Double Sideport techniques. It was found that Navitip Double Side port showed the better results in terms of extent of obturation and absence of voids when compared to the Rotary lentulospiral and Navitip. No significant difference was seen between three groups for extent of obturation [23].

BI-Directional spiral

This technique was developed by Dr Barry Musikant in 1988 using bidirectional spiral. Over extrusion of obturating material can be controlled by this technique. Coronal spiral push material in apex direction whereas apex spiral in coronal direction limiting the overfilling of canal.6 Bi-directional spiral mounted on slow-speed handpiece, inserted into the canal and withdrew gently while still rotating. The process

is repeated until the canal orifice appeared filled with paste. [24] A study was conducted using four techniques, past inject, Bi-directional, Lentulo spiral and Incremental obturating technique. Result showed that Bidirectional Spiral and Lentulo Spiral were superior to other techniques in providing optimally filled canals [24].

Pastinject (MICROMEGA)

Designed paste carrier having flattened blades, used to carry material inside the canal. Its superb flexibility allows it to flawlessly follow the form of the canal and additionally helical form creates a translational circulate movement, facilitates the delivery of the filling material and guarantees its perfect application onto the canal walls. [24] Study was conducted evaluating the radiaographic efficacy of Pastinject, Disposable needle and Capillary tips, capillary tips showed better filled canals and less time required for obturation [25].

CONCLUSION

Good obturation along with hermatic seal is the goal standard for both primary and permanent teeth root canal procedure. Each technique has there pros and cons but it is totally dependent on performer for perfect outcome. But further controlled studies and research are still necessary to find an ideal obturating technique for deciduous teeth which is fast, convenient yet efficient.

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