Pulpectomy: A Comprehensive Review

Akankhya Jena

Intern, Institute of Dental Science, Siksha O Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India

Abstract

Several pulp therapies both vital and non-vital pulp therapies for preserving the physiologic integrity as well as the well being of the tooth have been developed as a necessity for the healthy growth of the teeth. It mainly aims at protecting the teeth from trauma, caries, or any other infections. Pulp exposures resultants to caries are the most universal in deciduous teeth due to the relatively bulky size of the pulp chamber. The pulp in deciduous teeth is capable of healing, following control of infection, and inflammation. A pulpectomy is mainly preferred in non-vital teeth (done in various vital teeth also), where the teeth can be cleaned and disinfected and preserved for more no. of coming years. Pulp rehabilitation for pulpally implicated deciduous teeth continues to be a confront to practitioners. One of the majority important areas of continued examination is in the area of discovering obturating resources to suit the precise properties of these teeth. This piece of writing aims at reviewing the objectives, types, technique, restorative materials used, indications and contraindications and conclusion.

Keywords: *Pulp, Pulpectomy, Root Canals, Resorbing Material, Obturating Material, Vital And Nonvital Pulp Therapies*

Introduction

One of the majority important services a pediatric dentist can make available for the child patient is the adequate treatment of pulp involved deciduous teeth. For many years, different principles as well as techniques for the management and conservation of deciduous teeth have been suggested by the dental profession. The pulp is an obligatory element for maintaining the healthy physiological integrity of the tooth. Conditions like irreversible pulpitis, pulp necrosis, or dentoalveolar abscess in deciduous teeth are best treated by non-vital pulp therapies. Soft tissue therapy is extensively used during the management of pediatric patients, at the same time as attempting to stop happening impulsive exfoliation of the deciduous teeth.[1] The most important purpose of endodontic supervision is the full amount of exclusion of microorganisms commencing the root canal, and the avoidance of consequent reinfection. This is achieved through cautious cleanout in addition to shaping followed via the total obturation of the canal space. The final objective of endodontic obturation has remained the same intended for the past 50 years: to generate a fluid-tight close up along the length of the root canal arrangement, commencing the coronal opening of the apical termination. A pulpectomy is one of these therapies conducted on deciduous teeth for the prevention of subsequent re-infection by the total abolition of the microbes and bacteria from the root canals.[2]

Definition: Pulpectomy is a dental procedure that involves the entire exclusion of the coronal as well as the radicular portion of the pulp cavity to get admittance to the root canals that are debrided, inflamed, distended as well as disinfected moreover resorbable substance are used to fill the canals.[3]

Types:

Partial Pulpectomy: One third to one half of the coronal segment of the radicular pulp tissue is detached from the canals.

Complete Pulpectomy: complete removal of pulp tissue from the root canal

Objectives:

- Resolving of the infectious process, following the treatment

- Overextension as well as under filling should be avoided with successful radiographic evidence.
- Resorption of the deciduous tooth structure as well as filling material should take an appropriate time
- No other pathology or internal or external root resorption should be present
- There should be no sensitivity, pain or swelling present
- No further breaking down of the supporting tissues after the treatment.

Indications:

- Patients along with their parents should be cooperative.
- A patient with good health along with no serious disease is preferred
- Indications of deciduous teeth in absence of its permanent successor
- Irreversible pulpitis
- Internal resorption
- At least two-thirds of the root length is supposed to be accessible.

Contraindication:

- Mobile tooth or reduced bone support
- A tooth that is non-resorbable
- Any dentigerous or follicular cyst present beneath
- Root length remaining less than 2/3rd
- Perforation of pulpal floor
- Children those are medically compromised

Procedure:

Single-visit Pulpectomy:

Indication: This course of action is an addition of pulpotomy. Wherever the inflammation extends further than coronal soft tissue, indicated by hemorrhage from the amputated radicular stumps with the purpose of is oozing endlessly and is unmanageable.[4]

Procedure:

- Suitably administer local anesthesia along with isolation of the tooth using the rubber dam.
- Arrange an access cavity; expose the coronal soft tissue; all the reachable pulp tissue (coronal as well as radicular) is extirpated with the assistance of barbed broaches.
- After extirpation of the pulp tissue is completed, irrigate the pulp cavity as well as a canal using saline in addition to a diagnostic radiograph that is in use for the working length of the file.
- Shaping, irrigating of canals be undertaken, dehydrated the canals with absorbent paper points.
- Position the final restoration

Multiple visit Pulpectomy:

Indication:

- A tooth with necrotic pulp in addition to periapical involvement.
- The occurrence of illness, chronic sinus, or abscess.
- Nonvital deciduous tooth.

Procedure:

Through the first appointment:

a) Correctly administer local anesthesia as well as detach tooth from surrounding oral environment using a rubber dam.

b) arrange the access cavity as well as expose the coronal soft tissue along with extirpating of all pulp tissues using barbed broaches

c) Position the cotton pellet above the pulp chamber soaked by formocresol along with temporary restoration set over it.

Following the period of 1week recall the patient.

Through the second appointment

a) Smoothly eradicate impermanent restoration; irrigate the canals as well as begin with biomechanical preparation of canals.

Note: Employ appropriate working length of files to stay away from perforation of canals.

b) Irrigate the dry canals as well as place sterilized cotton pellets in addition to position temporary restoration above it.

Through the third appointment

a) Smoothly eradicate the temporary restoration, irrigate as well as dry the canals using absorbent paper points.

b) Coat the ramparts of canals using the luting consistency of cement with the assistance of reamers along with them fill the canals by bulky consistency of cement through the help of lentiluospirals.

c) Stick down the chamber through the temporary restoration.

Following the period of 1-week call the patient.

through the fourth appointment

a) Condition tooth is asymptomatic, place the final restoration; set a stainless-steel crown.

Procedure:

Access Opening:

Anterior deciduous teeth: The best sites of access opening are the lingual surfaces of the anterior deciduous tooth along with the permanent tooth. Except that stained maxillary deciduous incisors are approached through facial surface followed through an acid etch composite restoration.[5]

Posterior deciduous teeth: Deciduous Teeth are comparable to those of the permanent teeth. The simple divergence among the deciduous and the permanent teeth are the level of the crown, the bulging form of the crown as well as the very thin dentinal ramparts of the pulpal floor and its roots.

While the top of the pulp chamber is detached distinguish the orifice of the root canals.

- Canal cleaning along with shaping: - The canals cleaning in addition to shaping is the mainly considerable step of deciduous root canal management. The foremost intention of biomechanical preparation is debridement of canals. Only NiTi files are suggested for the deciduous root canal preparations. The canals are enlarged several sizes past the 1st file to fit contentedly in the canal through a minimum size of 30 to 35 no. file.
- Working length determination: - At the beginning working length is determined using a radiograph. The working length is after that determined via a radiograph by a Ni-Ti file inside the canals (apex locator is undependable and unreliable in working length determination in deciduous teeth). It is advisable with the intention that the working length would be shortened to 2 to 3mm short of radiographic root apex for precise length determination.[6]
- Filling with the material.

Obturating Techniques: Numerous techniques have been intended for substantial filling of substance into deciduous teeth canals The deciduous teeth with the bigger canals are capable of being filled through the slim mix; coating the ramparts of the canals with the aid of reamer in an anticlockwise course at the same time as taking out slowly followed by placement of thicker mix which is then pressed manually. The paste can be filled by way of lentiluospirals mounted on the micromotor handpiece. The course of rotary motion needs to be checked for the substance to appropriately flow into the canal. The endodontic pressure syringe is as well effectual for the insertion of the materials that are used in the canals. The vitapex system besides uses the syringe with the material in it. The syringe is introduced up to 1/5th distance as of the apex of the canal along with the material which is slowly injected at the same time as the syringe is withdrawn from the canal. Despite the technique adopted to fill the canal, care is supposed to be taken to avoid extrusion of material into the periapical tissues. The sufficiency of obturation is checked using radiographs. In the occurrence, if a small amount of ZOE is by mistake enforced through the apical foramen it is left unaccompanied since the material is resorbable. While the canals are satisfactory obturated a quick set temporary cement is positioned in the pulp chamber to close over ZOE canal filling. The deciduous tooth is restored in the company of a stainless steel crown.[7]

Filling of the deciduous root canals: Developmental, anatomic, and physiologic differences stuck between deciduous and permanent teeth call for differences in the criteria designed for root canal filling materials.[8]

Ideal requirements are:

- Resorb speed of the deciduous roots as well as the resorb material be supposed to be identical.
- It is supposed to be undisruptive to the periapical tissues along with the permanent tooth germ, resorb readily if hard-pressed further than the apex.
- It is supposed to have an unwavering disinfecting influence.

- It is supposed to be inserted without difficulty into the root canal as well as removed effortlessly if required.
- It is supposed to hold fast to the walls of the canals as well as should not shrink.
- It must not be soluble in water.
- Be radiopaque as well as not stain the tooth.

Filling materials used:

- ZOE paste: most regularly worn filling material in deciduous teeth. Disadvantages are the divergence stuck between its rate of resorption as well as that of the tooth root, including overfilling and underfilling. The success rate is 65%. This is also known as zinc oxide eugenol paste.
- Iodoform paste: Also known as KRI paste (Iodoform), it absorbs speedily as well as has no enviable result on succedaneous teeth when used as a pulp canal medicament during abscessed deciduous teeth. It even has a long-lasting bactericidal effect. Its success rate is 85%.
- Calcium hydroxide: calcium hydroxide along with Iodoform mixture has been found effortless, to apply as well as resorbs imprecisely more rapidly than that of the root, with no noxious end product on the descendant tooth in addition to, it is radio-opaque. It is nearly an ideal filling material with a success rate of 100%.
- Colla cote: it is a soft, white, pliable, biocompatible sponge obtained from bovine collagen. It is an absorbable collagen barrier, which prevents or diminishes extravasations of filling material used in the root canal treatment during deciduous molar Pulpectomy.
- Endoflas: - it can be used as an alternative root canal filling material for deciduous teeth. Microleakage should be prevented to have a success rate. Any signs of inflammation, the filling being replaced with the permanent filling material. The success rate is 70%.[9,10]

Conclusion

In conclusion, I would like to say that calcium hydroxide – Iodoform mixture is the closest to the being the ultimate root canal filling substance for deciduous teeth.

Ethical Permission: Not required

Conflict of Interests: None

Funding: None

Reference

1. Nedley MP. The pulpectomy in primary teeth. J Mich Dent Assoc. 2002;84(8):38-42.
2. Gadallah L, Hamdy M, El Bardissy A, Abou El Yazeed M. Pulpotomy versus pulpectomy in the treatment of vital pulp exposure in primary incisors. A systematic review and meta-analysis. F1000Res. 2018; 7:1560.
3. Tang Y, Xu W. Therapeutic effects of Pulpotomy and Pulpectomy on deciduous molars with deep caries. Pak J Med Sci. 2017;33(6):1468-1472.
4. Boonchoo K, Leelataweewud P, Yanpiset K, Jirarattanasopha V. Simplify pulpectomy in primary molars with a single-file reciprocating system: a randomized controlled clinical trial. Clin Oral Investig. 2020;24(8):2683-2689.
5. Tannure PN, Azevedo CP, Barcelos R, Gleiser R, Primo LG. Long-term outcomes of primary tooth pulpectomy with and without smear layer removal: a randomized split-mouth clinical trial. Pediatr Dent. 2011;33(4):316-320.
6. Howley B, Seale NS, McWhorter AG, Kerins C, Boozer KB, Lindsey D. Pulpotomy versus pulpectomy for carious vital primary incisors: randomized controlled trial. Pediatr Dent. 2012;34(5):112-119.
7. Yanko N, Khmil O, Kaskova L, Vashchenko I. Advanced endodontic developments in pulpectomy of primary teeth. Wiad Lek. 2016;69(2 Pt 2):223-227.
8. Ahmed HM. Pulpectomy procedures in primary molar teeth. Eur J Gen Dent 2014; 3:3-10
9. Tirupathi SP, Krishna N, Rajasekhar S, Nuvvula S. Clinical Efficacy of Single-visit Pulpectomy over Multiple-visit Pulpectomy in Primary Teeth: A Systematic Review. Int J Clin Pediatr Dent. 2019;12(5):453-459.
10. Nagarathna C, Vishwanathan S, Krishnamurthy NH, Bhat PK. Primary Molar Pulpectomy Using Two Different Obturation Techniques: A Clinical Study. Contemp Clin Dent. 2018;9(2):231-236.