

## Obturing Materials: A Review Literature

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### ABSTRACT

Pulpectomy consists of removing the pulp tissue associated with microorganisms and debris from the canal and obturating with resorbable filling material. Success rate of endodontic therapy depends on many factors like familiarity with the complexity of primary tooth canal systems, their formation and resorption pattern, obturating material as well as obturation technique used that is capable of densely filling the entire root canal system and providing a fluid tight seal from the apical segment of the canal to the cavo-surface margin in order to prevent reinfection. One of the major areas of research in pulpectomy is to discover new materials for obturation so to have the specific properties similar to teeth. This article will render the role of many important obturating materials which we use in dentistry and their advantages and disadvantages and their modifications.

**Keywords:** Obturating materials, Pediatric dentistry, Primary teeth

**Abbreviations:** ZOE: Zinc Oxide Eugenol

### INTRODUCTION

Pulpectomy of primary teeth is indicated when the radicular pulp tissue is necrotic. It should be maintained in the dental arch to maintain the arch integrity. Various obturating materials are reported with successful outcomes by various authors. Hence, the aim of this review is to present various obturating materials used in daily clinical practice [1,2].

The optimal requirements of an obturating material for primary teeth were listed by several authors Rabin Witch stated, the history of the treatment of root canals is the discussion of materials used.

It should not irritate the periapical tissue nor coagulate any organic remnants in the canal.

Excess pressed beyond the apex should be resorbed easily.

- It should be inserted easily into the root canal and removed easily if necessary.
- It should adhere to the walls of the canal and should not shrink.
- It should not be soluble in water.
- It should not discolor the tooth.

- It should be radiopaque.
- It should be harmless to the adjacent tooth germ.
- It should not set to a hard mass, which could affect the succedaneous tooth [3].

Pulp therapy is widely used in the treatment of pediatric patients, while attempting to prevent the premature exfoliation of primary teeth. Lewis and Law stated that the ultimate objective of pediatric pulp therapy as the successful treatment of the pulpally involved tooth to be retained. The main goal of endodontic treatment is the complete elimination of microorganisms from the root canal and the prevention of reinfection. This can be achieved by proper cleaning and shaping of the root canals followed by a well-

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sealed obturation of the canal space. The ultimate goal of endodontic obturation has remained the same for the past 50 years, i.e., to create a fluid-tight seal along the length of the root canal system, from the coronal opening to the apical termination. Root canal therapy was introduced as early as 1932, as a method for retaining primary teeth which would otherwise be lost [4]. When pulp necrosis occurs in primary teeth, it is of polymicrobial in nature with predominance of anaerobic bacteria lying deeply.

### OBTURATING MATERIALS

**Zinc oxide eugenol:** Zinc oxide eugenol (ZOE)\* is one of the most widely used materials for root canal filling of primary teeth. Bonastre (1837) discovered zinc oxide eugenol and it was subsequently used in dentistry by Chisholm (1876). Zinc oxide eugenol paste was the first root canal filling material to be recommended for primary teeth, as described by Sweet in 1930 [5].

**Endofloss:** - Endofloss is a resorbable paste produced in South America and contains components similar to that of Vitapex, with the addition of zinc oxide and eugenol. This paste is obtained by mixing a powder containing tri-iodomethane and iodine dibutylorthocresol (40.6%), zinc oxide (56.5%), calcium hydroxide (1.07%), barium sulphate (1.63%) and with a liquid consisting of eugenol and paramonochlorophenol. The material is hydrophilic and can be used in mildly humid canals. It firmly adheres to the surface of the root canals to provide a good seal. Due to its broad spectrum of antibacterial activity, Endofloss has the ability to disinfect dentinal tubules and difficult to reach accessory canals that cannot be disinfected or cleansed mechanically. The components of endofloss are biocompatible and can be removed by phagocytosis, hence making the material resorbable. Unlike other pastes, Endofloss only resorbs. When extruded extra-radically, but does not wash out intra-radically. The disadvantages of this material are that its eugenol content can cause periapical irritation. It also has a drawback of causing tooth discoloration. One study showed a lower success rate of 58% when there was overfilling but 83% success in cases with flush and underfilled root canals. Thus, it can be concluded that the Endofloss may be successfully used for root canal treatments in primary teeth particularly if care is taken not to overfill. Some studies have indicated that Zinc oxide eugenol has better antimicrobial activity as well as lower cytotoxicity than KRI paste Wright. Pabla et al. evaluated the antimicrobial efficacy of zinc oxide and eugenol, iodoform paste, Kri paste, Maisto paste and Vitapex aerobic and anaerobic bacteria obtained from infected non-vital primary anterior teeth.

**Maisto paste:** Maisto paste had the best antibacterial activity. Iodoform paste was the second best followed by zinc oxide and eugenol and Kri paste. Vitapex showed the least antibacterial activity [6].

**Metapex:** Metapex is a silicone oil-based calcium hydroxide paste containing 38% iodoform is very popular. Metapex contains radiopaque component barium sulfate which can help to control the deposition of material when seen radiographically. Iodoform is incorporated to improve the antibacterial properties of the material. Silicone oil acts as a vehicle. The effect of the high pH of calcium hydroxide alters the integrity of the cytoplasmic membrane by means of chemical injury to organic components and transport of nutrients, or by means of the destruction of phospholipids or unsaturated fatty acids of the cytoplasmic membrane, observed in the peroxidation process, which is a saponification reaction [7].

### DISCUSSION

There seems to be a moderate level of evidence to support the use of both ZOE and iodoform paste - with calcium hydroxide - as root canal filling materials for deciduous teeth. High-quality randomized controlled clinical trials with at least 12 months of follow up are necessary before a reliable conclusion can be drawn as to the best root canal filling material for endodontically treated deciduous teeth [8].

In 2009, the AAPD Guidelines cited iodoform-based pastes as suitable alternatives to ZOE. Metapex is a combination of 30.3% calcium hydroxide, 40.4% iodoform, and 22.4% silicone oil. The mixture can be dispensed into the root canals using disposable tips. The silicone oil content of metapex neutralizes the alkalinity of the paste to a certain extent, thereby causing lesser injury to the periapical tissues. Machida (1983) cited in Gupta and Das considered calcium hydroxide-iodoform mixture (metapex) to be an ideal pulpal filling material for primary teeth but reported that it resorbs a little faster than the rate of normal physiologic root resorption. Gupta and Das et al. showed overall success rates of 85.71% and 90.48% for ZOE and metapex pulpectomies, respectively, in children aged 4 - 7 years of age over a 6-month follow-up [9].

The principal aim of endodontic therapy is to maintain the integrity and function of teeth and their supporting tissues. The pulpectomy procedure is the treatment of choice in case of irreversibly infected pulpal tissue. Endodontic procedure not only aids in preserving pulpally involved primary tooth by eradicating bacteria and their products but also ensures a hermetic seal of the root canals [10]. Discrete materials used for obturation in primary teeth include ZOE\*, calcium hydroxide, Walkhoffs paste, KRI paste, Maisto paste, Vitapex, and Endoflas. Accomplishment of an endodontic treatment is marked by the eradication of the microorganisms and its products from the root canal. The materials used for obturation were ZOE\*, Endoflas, Metapex, and ZOP.

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