Zinc Oxide-Eugenol paste retained in gingival mucosa after primary teeth pulpectomy

ABSTRACT

Background: Long-term follow-up evaluations of pulpectomy in primary teeth have revealed retention of ZOE filling particles in the periradicular area even after root resorption. This paper reports a case of a child submitted to pulpectomy with ZOE paste in primary teeth. After 28 months, the filling particles remained, having migrated to the alveolar bone from the gingival vestibular mucosa during permanent dentition eruption. Aesthetics require periodontal surgical removal of the paste particles. Primary teeth submitted to pulpectomy should be evaluated carefully both clinically and radiographically to verify radicular and ZOE filling-paste resorption. The consequences of retained particles during permanent dentition eruption are unknown.

Key words: primary tooth; pulpectomy; tooth eruption; tooth resorption; zinc oxide-eugenol cement.

Introduction

The primary goal of pulpectomies in primary teeth is to eliminate infection and to preserve the tooth in a functional state until its normal exfoliation time without endangering the permanent dentition or the general health of the child [Reddy and Ramakrishna, 2007].

Zinc oxide-eugenol (ZOE) paste is probably the most widely used root canal filling for primary teeth in the United States [Primosch et al., 1997; Flaitz et al., 1989]. Although described as a resorbable material, long-term follow-up evaluations of pulpectomised primary teeth with ZOE have revealed a high frequency of retention of the overfilled material in the periapical area, even after physiologic root resorption [Flaitz et al., 1989; Sadrian et al., 1993; Sadrian et al., 1996].

Another investigation [Mani et al., 2000] revealed that 67% of all overfilled canals showed over-retained ZOE at 6 months follow-up and delayed resorption of the material when compared with physiological root resorption. Other studies have revealed that when ZOE is forced beyond the apex, because of its hardness, there is a risk of deflecting the erupting succeedaneous teeth [Ranly and Garcia-Godoy, 1991; Mortazavi and Mesbahi, 2004]. Due the difficulty of overfilled paste resorption, ZOE constitutes a real obstacle for permanent successor eruption [Pilipili et al., 1998].

This report presents a case of a child submitted to primary teeth pulpectomy using ZOE paste showing, after 28 months, retained particles of filling paste in the vestibular gingival mucosa during permanent dentition eruption. Because of aesthetic considerations, the treatment plan called for periodontal surgical removal of the retained ZOE particles, using local anesthesia.

Case report

A 5-year-old boy presented to the Paediatric Dental Clinic at the Federal University of Rio de Janeiro, Brazil, for dental treatment. The medical history was not contributory. Extraoral examination did not reveal anomalies, but at the intraoral examination the child presented poor oral hygiene and carious lesions in the maxillary central incisors. An orthopantomogram revealed no other abnormalities and the periapical radiographs showed periapical lesions affecting the primary maxillary incisors. An orthopantomogram revealed no other abnormalities and the periapical radiographs showed periapical lesions affecting the primary maxillary incisors. The treatment plan consisted of oral hygiene instructions, topical fluoride application, and pulpectomy with ZOE paste following composite resin restoration. A final radiograph showed that length obturation was slightly short. The patient was attending regularly until exfoliation of the primary incisors (Fig. 1). Despite successful treatment, unresorbed ZOE was observed in the alveolar bone during exfoliation of the primary maxillary central incisors.

After 28 months, the patient presented eruption of the permanent incisors and a poor aesthetic smile due to particles of filling paste visible in the vestibular gingival area, close to tooth 21 (Fig. 2). The patient and his mother were concerned about the gingival appearance and agreed to the proposed treatment plan, which consisted in surgical removal of the ZOE particles under local anesthesia.

The last follow-up, 38 months later, showed a healthy gingival mucosa; the final aspect satisfied the aesthetic expectations of the patient and his mother (Fig. 3). The patient is still making regular visits.
Discussion

The oral health policies and clinical guidelines of the American Academy of Pediatric Dentistry (AAPD) [2005] lists several objectives of pulpectomy procedures in primary teeth. The first is that there should be radiographic evidence of successful filling without gross overextension or underfilling. According to the authors [Sadrian et al., 1993] it is possible to remove retained ZOE by curetage immediately after exfoliation or extraction in overfilled cases. Observation has shown that ZOE could take years to resorb, but the retained paste caused no apparent pathology in the follow-up radiographs or exams.

Findings in the present case report may reflect that osteoclastic activity was too slow to eliminate the retained ZOE and suggests the possibility of nonresorption.

ZOE has been found to be potentially irritating to periapical tissues; it may even produce necrosis of bone and cementum, and extruded particles may develop a fibrous capsule that prevents resorption of the paste [Erausquin and Muruzabal, 1967]. Moreover, it was already reported that the overfilled ZOE induced inflammatory reactions, chronic or subacute, on the dental follicle of permanent successor [Pilipili et al., 1998]. However, in this particular case the patient did not experience pain, and no abnormalities in the alveolar bone were evident radiographically in spite of the paste being retained for a long time. Our findings confirm previous reports, which stated that no pathology was associated with retained ZOE [Sadrian et al., 1993]; this material caused no foreign-body reaction and did not affect the clinical or radiographic success of the pulpectomy [Ozalp et al., 2005]. It was suggested that overfilled material had migrated from the apical region toward the interradicular area, where complete resorption of the material failed to occur [Ozalp et al., 2005].

In this case report, the retained paste migrated to the alveolar bone from the gingival vestibular area, in a way similar to sinus tract or pus drainage. No reports could be found in the literature of a case of longtime ZOE retention and migration from the gingival vestibular area. The periodontal surgery was necessary because the paste particles were creating a poor aesthetic appearance.

Despite the high success rates of ZOE pulpectomies, this material presents disadvantages involving the difference between the rates of resorption of paste and root. Such differences may be clinically and radiographically observed even after primary teeth exfoliation. Therefore, primary teeth should be carefully evaluated to verify radicular and filling paste resorption in order to avoid prolonged retention of the treated teeth. Even in the present case, where retention of the ZOE was treated successfully, obturating the root canal with a resorbable paste could have prevented this complication. Further studies are necessary to evaluate the consequences of partial or no resorption of ZOE in the permanent dentition.

Conclusion

Paediatric dentists should be aware of the issues related to ZOE paste and root resorption after primary teeth pulpectomy. Periodic clinical and radiographic evaluation should be performed in order to avoid prolonged retention of the primary tooth, deflection of erupting permanent successor and retention of filling paste particles in the gingival mucosa during permanent dentition eruption.

Acknowledgments

We thank the CNPq (National Counsel of Technological and Scientific Development) for financial support.

References