ABSTRACT

This paper reports the management of an exposed pulp in a central incisor with incomplete root formation in an 8-year-old boy following trauma by partial pulpotomy with capping using Calcium-Enriched Mixture (CEM) cement and permanent coronal restoration. A one-year follow-up of the tooth showed normal response to cold and electric pulp tests and radiographic examination revealed normal closure of the root apex.

Keywords: Partial Pulpotomy; Immature tooth; Calcium-Enriched Mixture

Introduction

Dental pulp exposure is common during traumatic injury to tooth. Pulp therapy indicated when clinical signs of pulp vitality was present. The vital pulp therapy treatments like partial pulpotomy (Cvek pulpotomy) for traumatic exposures was first introduced in 1978 by Cvek. Calcium Hydroxide (CH) was the material of choice for several decades followed by Mineral Trioxide Aggregate (MTA) (the new gold standard for vital pulp therapy) are the most common materials used for pulp capping. Histologic studies on pulps capped with CH showed the following disadvantages, unpredictability of dentinal bridge formation, presence of inflammation in the underlying pulp and lack of long-term seal. MTA, in spite of all its proven advantages, had long setting time, poor handling characteristics and relatively expensive. Calcium-Enriched Mixture (CEM) cement, a new tooth-colored material, has the combination of characteristics of CH and MTA, including, superior anti-bacterial effect, good sealing ability, decreased working time and increased flow compared to MTA. Even though, there are several reports about the successful results of applying CEM cement as various treatment modalities’ successful partial pulpotomy in symptomatic traumatized exposed pulp in an immature tooth has not been found, yet. This paper reports the management of an exposed pulp in a central incisor with incomplete root formation in an 8-year-old boy following trauma by partial pulpotomy with capping using Calcium-Enriched Mixture (CEM) cement and permanent coronal restoration.

Case-Report

An 8-year old boy was referred to our department for treatment of his maxillary right incisor. His mother reported history of trauma to the tooth within last 24 hours. Patient experienced mild pain with sensitivity to cold beverages. Clinical examination revealed that the tooth had a pinpoint exposure with sensitivity to percussion while it was responsive to electric pulp test. On radiographic examination a tooth with open apex and a widened periodontal ligament was noticed (Figure 1). Local anesthesia was established using 2% Lidocaine and 1:100,000 Adrenaline. Following rubber dam isolation, partial pulpotomy was done with the removal of superficial inflamed tissue. The pulp and surrounding dentin were removed to a depth of 1-1.5 mm with a round diamond bur and a high-speed air turbine. The pulp wound was flushed using Sterile Saline till bleeding had ceased. NaOCl 5.25%, CEM cement (Bioquid) was used to dress the pulp wound. After covering the wound with cement, a 2mm thick layer of Glass ionomer (Fuji II, Fuji, Japan) base was placed and the tooth was restored permanently with light-cured composite (3M™ ESPE™ Filtek™ Z250). The patient was recalled one week after treatment. Clinical examination showed that the tooth was not sensitive to percussion anymore and the patient did not have any complaint of pain or sensitivity to cold (Figure 2). On radiographic examination of the tooth after one year showed tooth with completed apex. On clinical examination absence of sensitivity to percussion or cold was noticed (Figure 3).

Discussion

The success rate of Cvek pulpotomy in traumatic pulp exposures in immature teeth has been evaluated in several studies using CH or MTA. A study on partial pulpotomy with CH capping of 31 immature molar teeth with no clinical or radiographic symptoms preoperatively and six immature teeth with pain and follow-up of two years, revealed that this treatment was adequate for young permanent molars with carious exposure. A case-report with two years follow-up on partial pulpotomy of young permanent incisors with white MTA, showed that pulp vitality was maintained and lamina-dura remained intact on follow-up intervals. The advantages of partial pulpotomy compared to cervical or complete pulpotomy are its simplicity, less cost and the preservation of the cell-rich coronal pulp which has better healing potential and its ability to maintain physiologic dentinal deposition. Compared to CH and MTA, greater bioactive properties and less setting time of CEM cement, make it a potentially appropriate biomaterial for partial pulpotomy. These properties can be partly responsible for the acceptable outcomes in the presented case. CEM cement can induce Hydroxy Appetite crystal formation in the absence of environmental Phosphorus and has the ability to release Calcium and Phosphorus ions from indigenous sources.

Conclusion

In conclusion, partial pulpotomy of recently traumatize teeth with pulp exposure, can be an adequate permanent restorative procedure which eliminates the need for endodontic treatment.
Tavassoli-Hojjati et al

Authors Affiliations
1. Sara Tavassoli-Hojjati, DDS, MS, Assistant Professor, Department of Pediatric Dentistry, Shahed Dental School, Tehran, Iran, 2. Nazila Ameli, DDS, Postgraduate Student, Department of Orthodontics, Shahid Beheshti University of Medical Sciences, Tehran, Iran, 3. Mehdi Salehi Zeinabadi, DDS, Postgraduate Student, Department of Pediatric Dentistry, Shahed Dental School, Tehran, Iran.

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Address for Correspondence
Dr. Mehdi Salehi Zeinabadi, DDS, Postgraduate Student, Department of Pediatric Dentistry, Keshavarz Blv, Vesal Street, Shahed Dental School, Tehran, Iran.
Email: mehdi_s85@ymail.com

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