

Case Report

The Management of Badly Decayed Young Permanent Molar – A Conservative Approach

¹Dr. Bhari Sharanesha Rajashekara, ²Dr. Abdulfatah Alazmah,
³Dr. Bhari Sharanesha Manjunatha and ⁴Dr. Deepti Virupakshappa

Abstract

¹Lecturer, Department of Preventive Dental Sciences, College Of Dentistry, Prince Sattam Bin Abdul Aziz University, Alkharj-11942, Kingdom of Saudi Arabia.

²Assisitant Professor and Vice Dean for Clinical Affairs, Department of Preventive Dental Sciences, College Of Dentistry, Prince Sattam Bin Abdul Aziz University, Alkharj-11942, Kingdom of Saudi Arabia.

³Associate Professor, Dept. of Oral Biology, Faculty of Dentistry, Al-Hawiyah, Taif-21944, University of Taif, Kingdom of Saudi Arabia.

⁴Private Practitioner and Consultant Oral and Maxillofacial Surgeon, S S Layout, Davangere, Karnataka, India.

*Corresponding Author's E-mail:
drmanju26@hotmail.com

Early caries involvement and gross destruction of permanent mandibular first molars results in reduced masticatory efficiency and later may be malocclusion, esthetic and psychological problems for a smaller extent. Since most of the coronal structure is lost or damaged, routine direct restorative procedures do not always give satisfactory results. The restoration of shape, function and esthetics of badly decayed or severely damaged teeth is often a difficult task or a challenge to Pediatric Dentist. Such teeth are to be restored either by means of multiple Endo and restorative procedures or by Prosthodontic techniques. Here we present such a case where the crown structure was preserved by band adaptation and core build up followed by stainless steel crown placement. The calcium hydroxide and iodoform paste (Metapex) was placed in the root canals of immature permanent tooth. The tooth involved was evaluated at regular intervals for the first 12 months. At the end of 12 months, the case showed continued root growth and apical closure (apexification) with no evidence of periapical pathology. Later Conventional endodontic treatment was then performed. This case report highlights the importance to promote the Management of Badly Decayed Young Permanent Molar by conservative approach in children and can give promising results instead of extraction.

Keywords: Apexification, Badly Decayed Young Permanent Molar, Calcium hydroxide [Ca(OH)], immature permanent tooth, Metapex, Pediatric Dentistry

INTRODUCTION

The first permanent molar (FPM) erupts early into the oral cavity and subjected to decay more often than the rest of the teeth. It is important for the development of normal occlusion. The completion of root development in permanent teeth takes a minimum of three years after eruption. Simple conservative procedure of restorative filling is one of the treatments of choice of badly decayed FPM. But, it is not always passable when the tooth is very weak or when the tooth is badly/severely carious. Another issue arising in such cases is which restorative material to use during the procedure. Accomplishing complete debridement, canal disinfection and optimal

sealing of the root canal system are major challenges associated with endodontic treatment of teeth with open apices (Andreasen and Flores, 2007).

The treatment of severely decayed seen in young first permanent molars with incomplete root development has a lot of complexity in Pediatric Dentistry. When a normal natural apical constriction is absent, the formation of mineralized tissue in the apical region is important to create an apical barrier and allow 3-dimensional adaptation of obturating material within the root canal system. The most common intracanal dressing used is Calcium hydroxide and has been found to induce hard

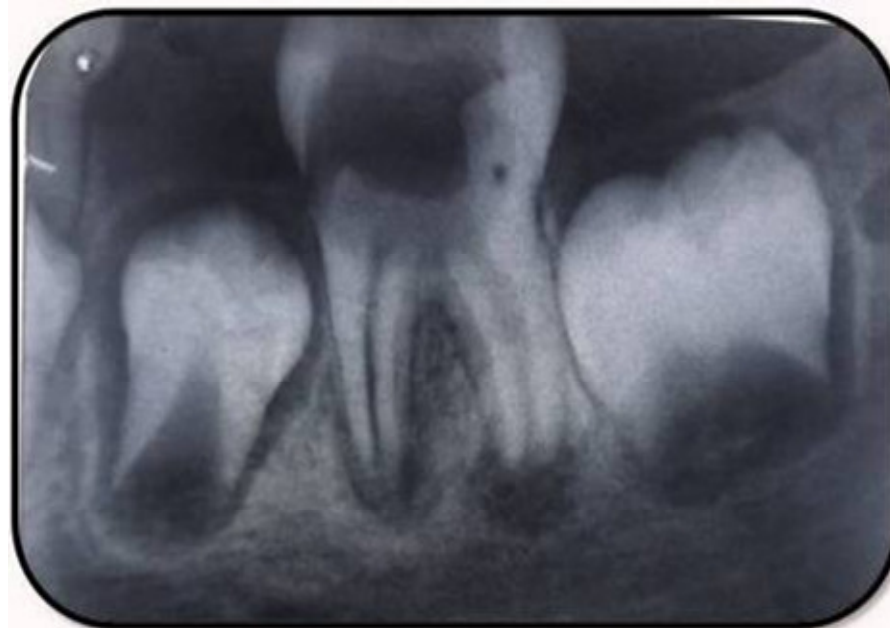


Figure 1. IOPA radiograph showing pulp, furcation and periapical involvement

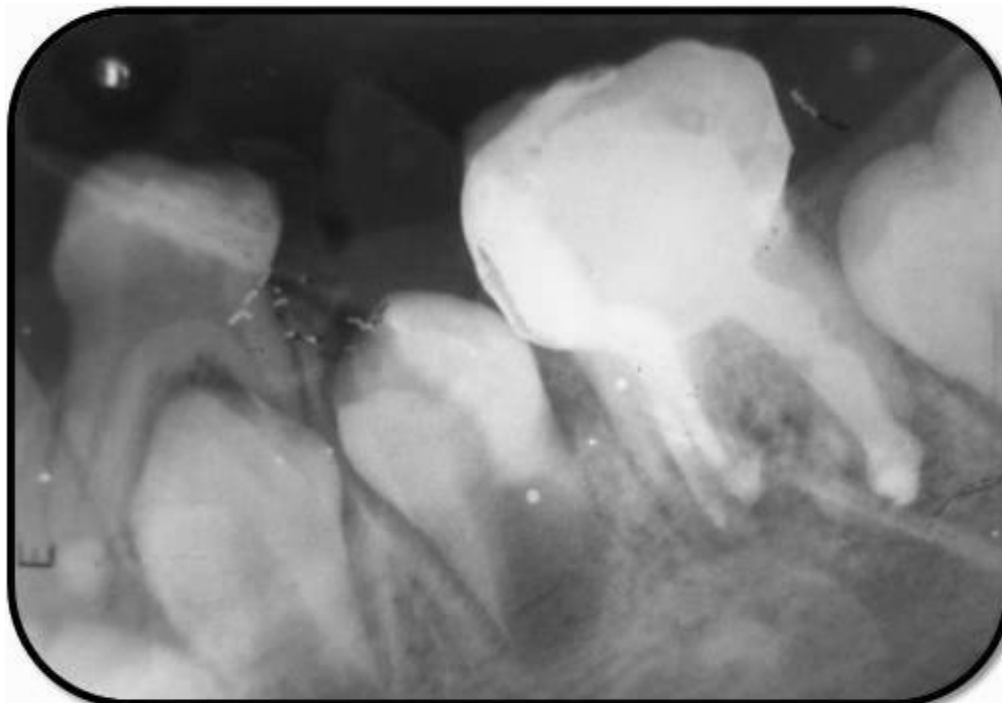


Figure 2. Showing band adaptation and placement of the metapex in the root canals

tissue deposition in necrotic teeth with open apices. It is renewed regularly till an apical barrier is formed (Leonardo et al., 1993).

It is unpredictable to know the time needed to form an apical barrier and mainly depends on the size of the apical foramen, the presence of infection and the host response (Leonardo et al., 1993; Felipe et al., 2005).

CASE PRESENTATION

A 9 year old male patient reported with the chief complaint of pain in left mandibular posterior region since one year. A clinical examination revealed deep carious lesion in mandibular first molar (#36) extending into the pulp. The radiographic examination of the tooth (#36)

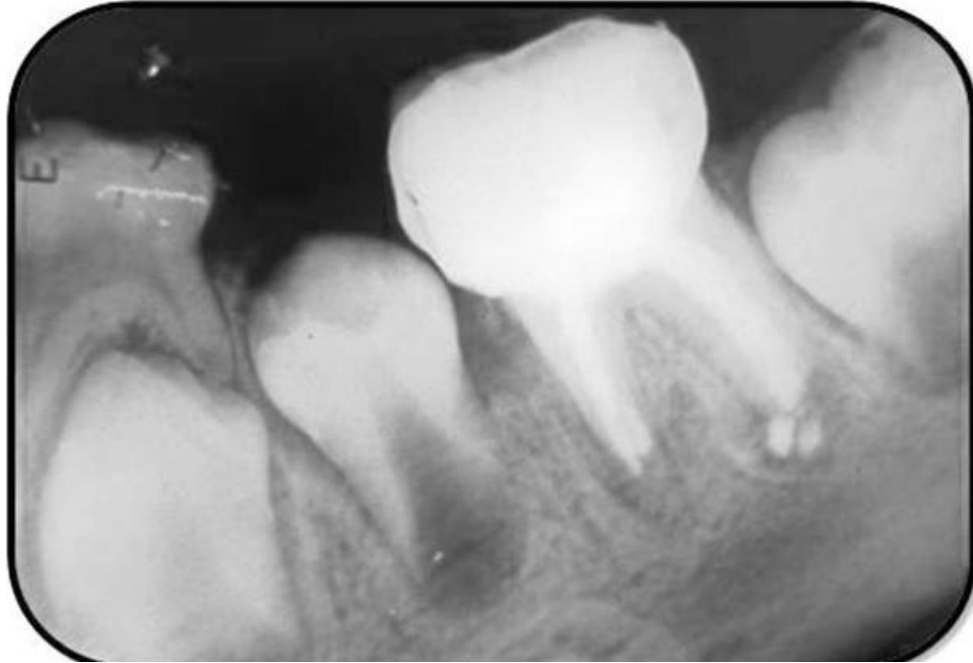


Figure 3. Showing completion of root canal treatment and stainless steel crown in place

confirmed pulpal, furcal and periapical involvement (Figure 1). The treatment was planned as extraction followed by space maintainer or an attempt of saving the tooth by endodontic therapy which was very challenging and difficult to restore because the crown was grossly destroyed due to caries. All the advantages and disadvantages, consequences of the treatment were explained but the parents of the patient was unwilling for extraction and choose the conservative approach of saving the tooth. The root apices were formed but not closed. It was decided to induce root completion by using calcium hydroxide and iodoform paste (Metapex). The crown was stabilized by band adaptation and the soft caries was excavated using sharp spoon excavator. The access cavity prepared working length was determined, chemomechanical preparation was done and Metapex was placed. Some of the paste extruded unavoidably through the open apex into the peri-apex. Access cavity was sealed with provisional material. An immediate post operative radiograph was taken to assess the extent and placement of the material in the root canals (Figure 2).

The progress of tooth for apexification was followed for 3, 6 and 12 months. At the end of 12 months there was an increase in the root length, so conventional root canal was performed. The core build up was done with miracle mix; the tooth was restored with a stainless steel crown (Fig 3). Follow up appointments and examinations were done at 3, 6 and 12 months. At the end of 1 year, the patient is asymptomatic and the tooth is completely in good condition in relation to esthetics, function and structure lost.

DISCUSSION

FPM has an extremely high caries rate in young patient population and is as high as 41% in China for decayed, missing, filled, teeth (DMFT) of FPMs (Noronha et al., 1999). However, 50–60% of the FPM occlusal surfaces were decayed or restored by the age of 11–12 years in the United States (1980s). In Brazil the FPM DMFT was about 40% and in the United Kingdom it was 45–48% (Albadri et al., 2007; Nurko and Garcia-Godoy, 1999).

The first treatment choice of badly decayed FPM is simple conservative procedure of restorative filling. But, it is not always satisfactory as the tooth has become too weak or the caries is too deep and most important concern is which restorative material to use for the procedure.

Apexification is defined as "a method to induce a calcified barrier in a root having an open apex or the continued root development of an incomplete root in teeth with necrotic pulp" (American Association of Endodontists, 2003). There are numerous procedures and materials recommended to induce root end closure in teeth with immature apices. The following materials are used for treatment of such cases:

1. Ca(OH) only or Ca(OH) mixed with various materials (Frank, 1966).
2. Mineral trioxide aggregate (MTA) (Walton and Torabinejad, 2002)
3. Infection control (Das, 1980)
4. Induction of a blood clot in the periradicular tissue (Ham et al., 1972)
5. Antibiotic pastes (Ball, 1964)

6. No treatment (Lieberman and Trowbridge, 1983)

However, Ca(OH)₂ remains a popular material to accomplish apical closure due to its apparent ability. This is because of its high alkalinity and bactericidal effect. It is also reported to stimulate alkaline phosphatase activity. It is also easily available and inexpensive. Recently, MTA is becoming more popular but when compared to Ca(OH)₂, it is expensive and the technique is more difficult to place the material into the root canal. Calcium hydroxide-iodoform paste (vitapex, metapex) contains calcium hydroxide 30%, iodoform 40%, silicone oil 22%, others 7 % as main ingredients. The root canals are filled using disposable tips are provided by the manufacturer with the material. It is thought that the silicone oil neutralizes some of the transient alkalinity of the paste and results in lesser injury to the periapical tissues (Allen, 1979). The combination of Calcium hydroxide-iodoform paste shows very good results when used as an obturating material in pulpectomy. It is available as premixed in polypropylene syringes (Vitapex, Metapex). It has good resorbable properties and radiopaque in nature which does not set to a hard mass can be easily inserted and removed from the canals. It is harmless to permanent tooth germs and gets resorbed when extruded from the apex (Nurko et al., 2000; Kawakami et al., 1987). Success in achieving apexification depends on an accurate diagnosis, an understanding of the biological processes involved, and ideal case selection.

In apexification completion of root development can be achieved by placement of certain biocompatible materials in the root canals to the apical region. Use of calcium hydroxide and iodoform in apexification also has been reported (Weng, 2004; Gu et al., 2007).

Weng (2004) evaluated 64 younger permanent teeth with underdeveloped root apices and necrotic pulps. After the root canals were prepared and sterilized, Vitapex paste was placed in an attempt to achieve apexification. All the teeth were observed for three years, and 24 teeth (37.5 percent) successfully achieved apexification, 37 teeth (57.81 percent) were in the process of root-end closure, and only 3 teeth (4.69 percent) failed to achieve apexification. Altogether the treatment was successful for 61 teeth, for an effective rate of 95.3 percent. Weng (2004) concluded that Vitapex paste was an effective material for achieving apexification for younger permanent teeth. In this case both clinical and radiographic follow-up of the teeth treated with Metapex showed the absence of clinical symptoms and continued hard-tissue formation at the apex.

CONCLUSION

There is lack or little data or literature related to treatment decisions for management of badly decayed FPM. Few important clinical factors such as pulp vitality and exposure, apexification and age of patient affect the

treatment decision making in the management of severely or badly decayed FPM. The case treated with Metapex showed good clinical and radiographic evidence of success in promoting continued root growth and inducing root-end closure in immature young permanent teeth. Metapex can be used as a medicament to promote root growth and apexification. The band adaptation helped in preventing the fracture of crown during caries excavation and core build up. However, we believe that conservative approach of Management rather than extraction of Badly Decayed Young Permanent Molar in children can give promising results. Finally, we recommend the guidelines of American Academy of Pediatric Dentistry (AAPD) for appropriate decision making in management of severely or badly decayed FPM

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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