Non-surgical management of non-vital immature permanent teeth with large periapical abscess : A Case Report with 8 months follow-up.

Abstract

Aim: This case report aims to present non-surgical management of non-vital immature permanent maxillary central incisor with large periapical abscess within 8 months of follow-up.

Methods & Materials: The traumatic case was presented where the calcium hydroxide and iodoform paste (Metapex®) was placed in the root canals of immature permanent teeth with large periapical abscess. The teeth involved were evaluated radiographically at regular intervals for the 8 months after placement of the paste. At the end of 8 month, the case showed continued root growth and the apical closure (apexification) with no evidence of periapical radiolucency. Conventional endodontic treatment was then performed.

Conclusion: In this clinical case, the calcium hydroxide and iodoform paste (Metapex®) was found to induce apical closure when assessed radiographically and clinically. After 8 months the case showed continued root growth with healing in the periapical abscess.

Keywords: **Metapex, calcium hydroxide, Apexification etc.**

INTRODUCTION

Traumatic dental injuries involving anterior teeth is a relatively common occurrence during childhood resulting in inflammation or necrosis of the pulp and subsequent incomplete development of root apices.[1] Such teeth present with wide root canals and open apices cause the endodontic treatment technically more difficult and time-consuming.[2] Due to the lack of an apical barrier to contain the root filling material, the obturation of the root canal with an open apex is difficult. The treatment of choice in such type of case is apexification, i.e. establishing an apical barrier.[3]

Apexification is any method responsible to induce a calcific apical barrier in a root with an open apex or continued development of the apex of an incomplete root in teeth with non-vital pulp". Traditionally, calcium hydroxide Ca(OH)2 has been widely used for the apexification procedure due to its biological and healing performances. Calcium hydroxide combined with other materials has been proven to be the most commonly used material for apex closure. Apexification with calcium hydroxide involves repeated stimulations, for at least 6- 24 months, until apical closure is achieved.[4] Metapex, a silicone oil-based calcium hydroxide paste containing iodoform (40.4 percent), calcium hydroxide (30.3percent), and silicone oil (22.4 percent) and has been used as a root canal filling material in primary teeth. It is a viscous paste mixture consisting of calcium hydroxide and iodoform with barium sulphate as an opacifier shown great success when used for pulpectomy in primary teeth.[5]

Use of it in apexification has also been reported. The superior antimicrobial effects of calcium hydroxide may be due

to the combination with iodoform and to the viscous and oily vehicle, which may prolong the action of the medicament. The present case report describes the successful non-surgical management of non-vital immature permanent maxillary central incisor with open apex and large periapical abscess with 8 months follow-up.

CASE REPORT

A 13-year-old female patient reported to the Department of Pediatric and Preventive Dentistry, K.D Dental College, Mathura, U.P, India with a chief complaint of swelling in association with her permanent maxillary right central incisor. On further examination, it was found that there were no signs of caries or fracture but was sensitive to percussion and palpation. Also the pulp vitality was checked with the help of the electric pulp tester which showed the negative results. A radiographic image revealed an open apex associated with large periapical radiolucency to the right maxillary central incisor. The dental history disclosed that the patient has suffered dental trauma 2 years back with recurrent swelling.

After administration of local anesthesia, a rubber dam was placed and the access cavity was prepared. Working length was determined with a no. 15 k file and root canal preparation were done till no. 80 k file (DENTSPLY) using circumferential filing motion. The canal was irrigated copiously with 2.5% sodium hypochlorite (Vishal Dentocare Pvt Ltd, Hyderbad) and saline. The canal was dried with the paper point, and triple antibiotic paste (metronidazole, minocycline, and ciprofloxacin in the ratio of 1:1:1) mixed with propylene glycol was placed as an intracanal medicament and the access cavity was sealed with a temporary restoration.

At 14 days recall appointment, the intracanal medicament was replaced with metapex (Meta biomed Co. Ltd., South Korea) and the patient was recalled at 2, 3, 5, 6, and 8-month intervals. Metapex dressing was replaced on every subsequent visits i.e 2, 3, 5, 6, and 8 month. The patient was clinically asymptomatic and radiographic evaluation showed a reduction in the periapical lesion and disclosed significant apical development of the tooth at 3 months intervals. Follow-up evaluation at 6 months from the time, revealed similar clinical findings and more healing of periapical lesion but the apex was not closed. After 8 months from the time of the induction, the apex was found closed radiographically . Root canal therapy was conventionally accomplished in 2 visits with the help of gutta percha cones(Dentsply).

DISCUSSION

Apexification is the treatment of choice after confirmation of pulpal necrosis in immature permanent teeth. The procedure involves canal cleaning and shaping or the removal of all necrotic tissue, and hermetic sealing of the tooth by the placement of suitable material to the apex to avoid bacterial infiltration. The prime importance of the apexification procedure is to attain an apical stop for compaction of obturating material.[6] Various new materials have been intoduced for induction of apical barrier formation in nonvital permanent teeth such as calcium hydroxide paste, lime powder mixed with different vehicles, tricalcium phosphate, collagen

phosphate, osteogenic protein-1, bone protein, oxidized cellulose, Mineral trioxide aggregate, etc.[7]

Metapex has been the first choice material for apexification because of its antimicrobial action on bacterial cellular components mainly on lipopolysaccharide (LPS) (Jiang et al., 2003) and its high pH causes induction of hard tissue formation (Javelet et al., 1985). lime in contact with vital tissue in the apical area seems to cause tissue reactions similar to those in the coronal pulp. The apexification procedure usually takes 6-24 months and refilling of root every 3-6 months is favored.[8]

Metapex paste is an effective material for achieving apexification for younger permanent teeth. Metapex releases lime slowly and tends to remain in the canal and exert its effects over a considerable period. There are also a drawbacks of using metapex such as it get resorbed after it is pushed beyond the apex and also causes discoloration of the teeth.

In the present study, glass ionomer cement was used to restore the access cavity after the placement of metapex in the root canal. This was done to supply an adequate coronal seal and prevent any microleakage.

A study by Ghosh et al. showed 100% success with metapex as compared with calcium hydroxide mixed with water and non-setting calcium hydroxide with water.[9]

A similar finding was reported for apexification by Gu et al., where there was complete root development and apical closure.[10]

In another study, Weng evaluated 64 younger permanent teeth with underdeveloped root apices and necrotic pulps. All the teeth was observed for three years, and 24 teeth (37.5percent) 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. Weng concluded that Metapex paste was an effective material for achieving apexification for younger permanent teeth.[11]

Lu & Qin compared an antibiotic paste and Metapex paste for their use in apexification. Over a follow-up period of 30 months, they concluded that both materials showed the same level of radiographic success. But in cases where periapical inflammation was present, the antibiotic paste produced superior results.[12]

The present case indicates good results with metapex as an apexification agent taking into consideration the cost factors, simple placement, and radiographic interpretation. This report shows both clinical and radiographic success in achieving apexification. Unlike barrier formation, continued root growth was observed for the treated tooth.

CONCLUSION

Metapex shows good clinical and radiographic success in promoting continued root growth and inducing root end closure and also healing periapical lesion in immature necrotic young permanent teeth**.**

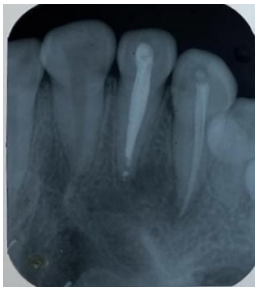
Pre-operative

2 months follow up

3 months follow up

5 months follow up

6 month follow up



8 month follow up

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