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Long Term Follow up of a Case of MTA Pulpotomy in Immature Permanent Tooth with Complicated Crown Fracture

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Abstract

In Young permanent teeth with trauma, pulpotomy is conventionally performed to promote apex genesis. Objective is to promote root development and apical closure in young permanent teeth. Endodontic treatment is thereafter, completed once apical closure and root end development is achieved. However, many studies have suggested presence of bacteria is required to cause pulpitis and not only the pulp exposure alone. It's also proposed that when good coronal seal is present, endodontic treatment may not be necessary following pulpotomy. In this article, we report a case of traumatized, young maxillary permanent central incisor, which has been treated with MTA pulpotomy, with a two-and-a-half-year follow-up.

Keywords: MTA, Vitality, Partial Pulpotomy

Introduction

To preserve pulp vitality is of utmost importance because a vital pulp can initiate several defence mechanisms which protect our body from bacterial invasion. Thus, it's beneficial to preserve the function and vitality of an exposed pulp instead of replacing it with root filling material after pulp exposure.[1] (Mejare et al) Surgical amputation of 2 - 3 mm of damaged, inflamed coronal pulp tissue followed by placing a biocompatible agent to promote healing and maintain

vitality of the remaining pulp tissue is vital pulp therapy called partial pulpotomy[2]

Extent to which pulpotomy is done is decided on the basis of etiology of pulp exposure (caries or trauma), whether its primary or permanent tooth, stage of tooth - root development (open or closed apex), type of tooth fracture (simple or complicated), presence of injury to the alveolar bone or periodontium and after assessing the condition of pulp clinically. Primary tooth pulpotomies are due to carious pulp exposure involving complete coronal pulp removal.[3] On the other hand, Permanent teeth with complicated crown fracture are treated with Cvek's pulpotomy. This includes removal of 2–3 mm of the inflamed and damaged coronal pulp located adjacent to the pulp exposure.[3,4] Success rate of Cvek's pulpotomies in complicated crown fractures of permanent teeth has been reported from 87.5% to 100%.[5]

Case report

An 8 ½ yr old male patient reported to the department of pedodontics & preventive dentistry of Himachal Dental College and Hospital, Sunder Nagar with chief complaint of a broken upper right side front tooth. Child gave h/o fall while playing a day before in school. Medical history was non-contributory.

Clinical examination revealed a complicated crown fracture of enamel, dentine and exposing pulp Fig (1). Pulp was not completely exposed but covered with a fine layer of dentine which showed reddish hue of pulp which can be seen in Fig (2).

Fig 1: Complicated crown fracture

Fig 2: Pinkish hue of pulp visible in complicated crown fracture.

Tooth was immature with open apex seen in Fig (3). Patient had reported almost after 24 hr after the trauma. When pulp vitality was checked, tooth was found to be vital and asymptomatic. Based on the above findings, the tooth was scheduled for Partial Pulpotomy with MTA.

Fig 3: Immature tooth with open apex.

Fig 4: MTA pulpotomy done.

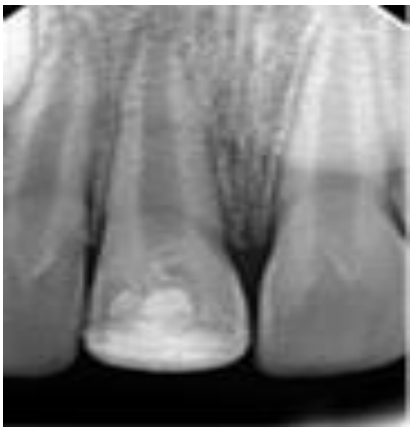

Fig 5: Tooth restored with Composite restoration

In first visit, an access cavity was prepared after administering local anaesthesia. Coronal pulp was then removed using sharp spoon excavator and chamber was then rinsed with saline thoroughly. Fig (3) Bleeding was stopped keeping moist cotton pellet for 3 to 5 min on amputated pulp stumps. When bleeding had stopped MTA mix was placed gently over the amputated pulp stumps Fig (4) and then cavity was sealed with resin modified glass ionomer cement and tooth was restored with adhesive resin composite restoration Fig (6).

Fig 6: Tooth restored with composite.

The patient was called for follow up after 1 week for clinical and radiographic follow-up. Patient was asymptomatic with no periapical radiolucency. Subsequent follow ups were done after 1 month ,6 month, 1 yr and 28 months. Periapical radiographic views showed no periapical radiolucency and the root showed continuous development with increase in dentinal wall length & thickness. Patient was asymptomatic and had no complaint of pain.

Fig 7-A: 1 month follow up

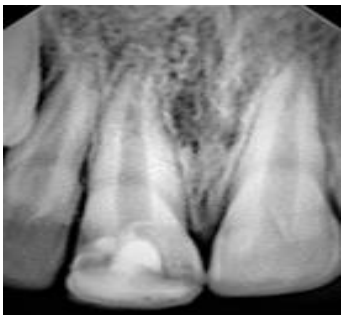

Fig 7-B: 12 month follow up.

Fig 7-C: 18 month follow up

Discussion

Traumatic dental injuries are very common in children between 6 to 9 yrs of age. In complicated crown fractures, preserving the vital dental pulp or part of it in

a healthy state is the main goal while treating young permanent teeth.[6,7,8] Pulpotomy is an effective treatment for infected (as a result of the carious process) or mechanically exposed vital pulps in primary and immature permanent teeth[9,10]. Due to its high success rate, it is an acceptable clinical technique for treating inflammation of coronal pulp. Treatment involves removal of coronal pulp followed by application of medicaments such as calcium hydroxide, MTA, form cresol, ferric sulfate, glutaral dehyde and then final restoration[11].

Various materials have been used for pulpotomies with successful clinical results varying from calcium hydroxide to MTA and now Bio dentine.

When Calcium hydroxide and MTA pulpotomies were compared in 30 immature permanent teeth for one year it was found that although MTA cases were successful but 2 Calcium hydroxide cases displayed periapical inflammation.[12] Bacterial invasion due to microleakage and delayed treatment is the primary cause of periapical inflammation .Several in vitro and in vivo studies have shown that MTA prevents microleakage, is biocompatible and non-resorbable, has low solubility and high comprehensive strength, and promotes tissue regeneration when it is placed in contact with dental pulp or peri-radicular tissues.[13]

Calcium hydroxide has also been used in vital pulpotomies to cause a coagulation necrosis, inducing a low-grade irritation that leads to differentiation of the undifferentiated pulp cells.

These cells synthesize predentine which is subsequently mineralized, while the coagulated tissue is calcified.[14 But] when compared with MTA, which produces significantly more dentinal bridging in a shorter period of time with significantly less inflammation and also provides a hard-setting, non-resorbable surface without the presence of tunnels in the dentine barrier.[15] Therefore, in the case presented here, MTA was used for the vital pulpotomy treatment.

Conclusion

MTA pulpotomy in complicated crown fracture of immature permanent teeth as a pulpotomy agent was successful in preserving vitality and function of remaining pulp, dentin bridge formation, increasing length and thickness of dentinal walls and complete root formation.

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