



Case Report

Vital Reattachment with Pulpotomy using MTA of Fractured Permanent Maxillary Central Incisor: An Esthetic Approach

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Abstract

The tooth fragment reattachment is found to be the ideal method of restoring the fractured crown whenever the fragment is present in toto. The fragment reattachment provides optimal esthetics with minimal loss of tooth structure. It is very economical and requires a single visit for the restoration. It maintains the natural integrity like color, contour and texture there by fulfilling the aesthetic requirements deemed by the patient. Temporary functional and aesthetic restoration is necessary for traumatised anterior teeth. Composite resins have traditionally been used to repair such damage. The main drawbacks of these items are colour mismatch and inconsistent wear. The therapeutic approaches range from straightforward reattachment to intricate multidisciplinary methods. The emergence of adhesive dentistry has made fragment reattachment easier and more dependable. Utilizing mineral trioxide aggregate, pulpotomy was carried out in this case report, and critical tissues were then reattached using composite resin restoration.

Keywords: *Fractured fragment; tooth fracture; reattachment; vital teeth; conservative approach; pulpotomy.*

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INTRODUCTION

Dental trauma frequently has a negative impact on the patient's social and psychological health. Permanent incisor coronal fractures account for 18–22% of all dental hard tissue damage, with enamel and dentin accounting for 28–44% of simple and 11–15% of complex fractures (enamel, dentin and pulp). In 96% of them, the maxillary central incisors are involved [1]. According to reports, the majority of dental injuries happen in the first 20 years of life, typically between the ages of 8 and 12 years [2].

The prevalence is higher in boys than in girls depending on age, with a male to female ratio ranging from 2:1 to 3:1 [3,4]. 84 treated permanent incisors with root fractures were the subject of a study that discovered 17% of the fractures occurred in the apical third, 56% in the middle third, 27% in the gingival third, and 29% in the crown, involving the enamel and dentin [5].

If the following conditions are met vital pulp therapy has a higher prognosis: (1) uninflamed pulp ; (2) Controllable Haemorrhage; (3) a Biocompatible capping substance is placed; and (4) Ability of the capping material to seal out bacteria.

The removal of infected pulp tissue down to the level of healthy coronal pulp is referred to as partial pulpotomy or Cvek pulpotomy [6]. The idea behind pulpotomy, according to Cvek, is that inflamed tissue should be excised in order to increase the likelihood that the healthy underlying tissue would stay healthy and to seal the exposure with hard tissue bridging of the exposure site, as a result, the success can be increased [5].

Despite this, evidence-based literature demonstrates that materials have little impact on fracture strength recovery. Only when there is a suitable adaptation between the broken parts can reattachment be accomplished. The length of time affects how well the reattachment goes [7,8]. The strength will get more dehydrated and inferior the longer the fragment is in place. Reattaching shattered fragments has benefits such as immediate aesthetics, more dependable outline form, potential to keep the occlusal function, absence of differential wear, and patient acceptance [9-11].

This paper entails about the successful vital pulpotomy using mineral trioxide aggregate followed by esthetic reattachment of the coronal fragment in permanent maxillary central incisor post trauma less than 2 hours.

Description of Case

A 22 year old patient with non-contributing medical history came to the Department of Conservative Dentistry and Endodontics, Saveetha Dental College, for treatment of fractured permanent maxillary central incisor less than two hours of trauma.

The patient was given IM tetanus toxoid injection. Clinical examination of teeth revealed a class III Ellis fracture of 21 and class II Ellis fracture of 11 (Fig 1A), positive EPT and thermal response, mild lacerations were seen in lower lip. Radiographs were taken to visualize the fracture site and to see any periapical pathology. It revealed the fracture approximating pulp of 21 and level of dentin 11 respectively with no widening or any pathology (Fig 1B). In Fig 1C, the pulp exposure was clearly evident in 21. Patient had brought the fracture segment in a jar containing cold water.

Infiltration was given using local anaesthesia (1.8ml of lignocaine HCl with 1:2,00,000 units of adrenaline) in

the maxillary central incisor region; the fragment was replaced in a sterile saline solution (Fig 1D). The teeth were isolated using a rubber dam, and the surface was disinfected using Iodine. A sterile diamond straight fissure bur, rotating at high speed under copious water spray was used to surgically excise the inflamed pulp tissue upto 2 mm. Bleeding was arrested using 3% sodium hypochlorite damped in a cotton (Fig 1E). The excision was considered complete when the pulp stump no longer bleeds excessively. Freshly mixed white Mineral trioxide aggregate (MTA) was mixed in a mixing pad and agate, according to the manufacturing instructions and placed in the prepared cavity (Fig 1F). Total etch approach was followed to reattach the fragment using composite resin (Fig 1G). No demarcation was noted after reattaching (Fig 1H). In 11 direct composite resin restoration was done as the fracture was upto dentinal level. The postoperative radiographs were taken two days (Fig 1I).

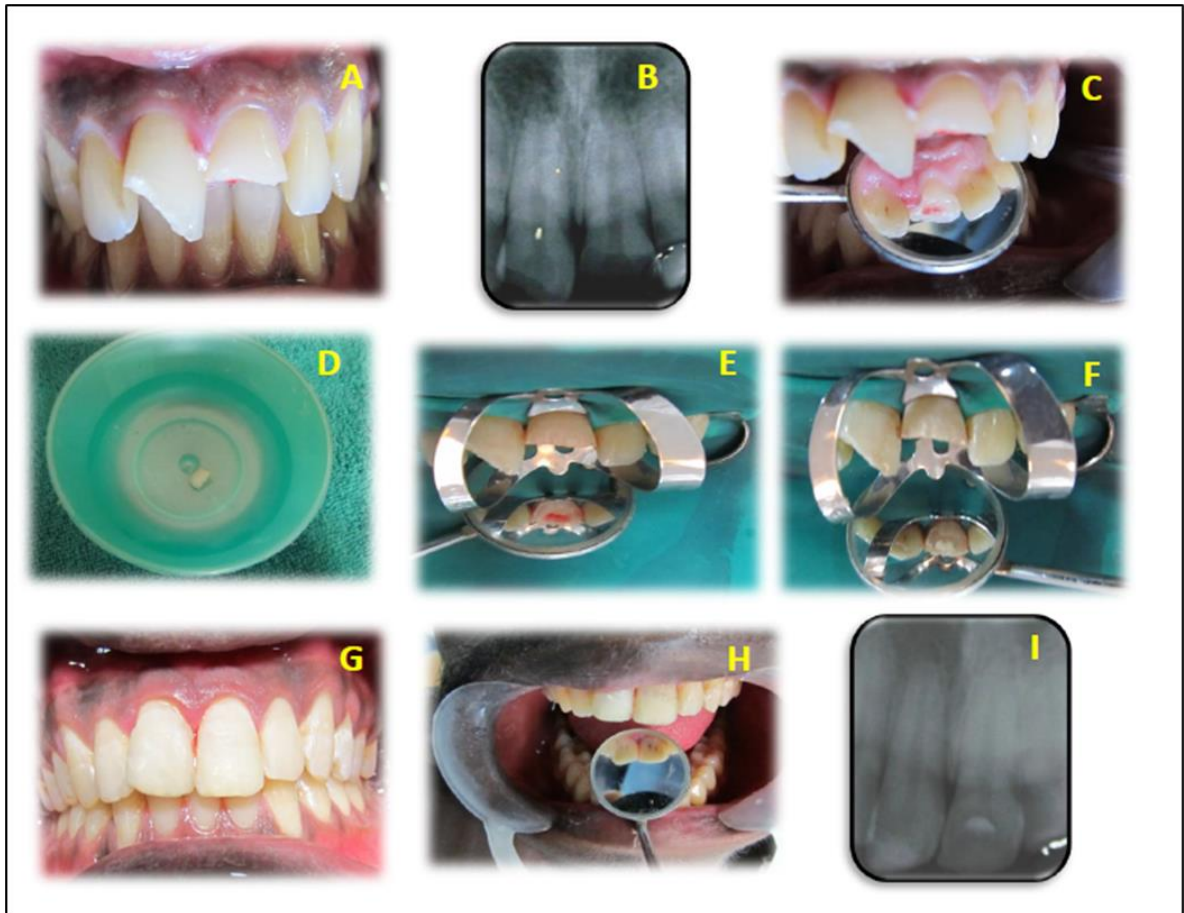


Figure 1: A- Pre-treatment photograph, B- Pre-treatment IOPA; C- Evidence of Pulp exposure on clinical examination; D- Fragment in saline solution; E- Arresting of bleeding with NaOCl; F- MTA dressing; G- Reattachment of the fragment using composite; H – After curing; I – Post-operative radiograph taken after 2 days.

DISCUSSION

The most frequent traumatic dental injury is a fracture, which in young patients is typically accompanied by pulp exposure [12]. Due to the likelihood of some inflammation and contamination, treating these patients is difficult. The decision to maintain the pulp in such cases is dependent on two key factors: (1) the severity of the pulp injury, and (2) the amount of tooth structure that is still there, which should be sufficient to sustain an immediate restoration [11].

Less than two hours passed following the fracture in the current investigation, and the therapeutic process was finished without suffering a significant loss of time. There was no indication of root fracture or widening on the radiograph. The surgery involved removing 1-2 mm of the tooth's pulp tissue and capping it with white MTA while using the correct isolation techniques [7,8].

Certain qualities are needed during selection of pulp capping material, such as: the ability to stimulate mineralization, eliminate germs, and create a strong anti-bacterial seal. The best substance for important pulp treatment should be able to withstand persistent bacterial leaking, encourage the recovery of remaining pulp tissue, and aid in the production of dentin. When vital pulp therapy is the preferred course of treatment, MTA showed promising results.

MTA is composed of tricalcium silicate, bismuth oxide, di-calcium silicate, tricalcium aluminate, and calcium sulfate dihydrate. MTA has proven to have the ability to cause the production of hard tissue in pulpal tissues whether employed as a pulpotomy or direct pulp capping substance [8–10]. In vitro, MTA encourages brisk cell development. According to histologic analysis of animal and human research, MTA promotes the production of reparative dentin with thick dentinal bridging, little inflammation, and minimum hyperemia. Overall, vital pulp treatment with MTA results in barely detectable pulpal necrosis [8, 11–15]. Higher success rates, ranging from 93% to 100%, have been reported in the human clinical data using MTA pulpotomies in cariously exposed permanent teeth [16]. Since the fragment had an excellent bond strength with MTA when utilising composite resin [17] it was bonded using a total etch method.

CONCLUSION

Undoubtedly, a recent traumatic or mechanical exposure has a higher chance of success than a carious exposure. An alternate procedure called partial pulpotomy encourages pulp repair in permanent teeth with critical crown fractures. It needs to be handled in a more systematic way. Additionally, these important pulp therapies typically have better success rates in young, either chronologically or physiologically, permanent teeth.

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