

Endodontic Retreatment and Internal Bleaching of A Central Incisor Following Dental Trauma - Case Report

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Abstract

Background: Crown discoloration is one of the complications associated with traumatic dental injuries. Internal bleaching is a non-invasive method to restore tooth color which is performed after endodontic. **Case Report:** A 25-year-old man was referred suffering from occasional, spontaneous toothache around the maxillary right incisors. When he was 15 years old, he had tripped and fallen, traumatizing the UR1 and causing an enamel-dentine fracture that did not expose the pulp. Three years after the accident, the UR1 started to become painful. The general dental practitioner root filled the tooth and it settled down. When a periapical radiograph was exposed it showed a poor root filling and large apical radiolucency. **Case Management:** Treatment begins with endodontic retreatment, then internal bleaching to restore tooth color and direct composite as the definitive restoration. **Discussion:** This case, the tooth had been traumatized 10 years earlier, tooth become necrotic after injury and the radiolucent area was the result of apical periodontitis. It is important to do root canal retreatment to remove the failed root canal filling material to allow disinfection of the root canal. Tooth whitening following root canal treatment can be carried out using an internal bleaching technique with materials such as sodium perborate sealed in the access cavity. Placing calcium hydroxide paste into the pulp chamber after internal bleaching could increase the pH, thus, inhibiting the osteoclastic activity and increase adhesive capacity of the dentine-bonding agent. **Conclusion:** Internal bleaching offers conservative approach in whitening discolored tooth without damaging tooth structure and have good aesthetic result. Direct composite restorations for crown fractures with missing fragment represents the most minimally invasive method.

Keywords: Trauma; Retreatment; Discoloration; Internal bleaching; Minimal invasive

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I. Introduction :

Fracture of anterior teeth by trauma is the most frequent type of injury in the permanent dentition, especially among children and adolescent affecting up to 25% of this population.¹Traumatic injuries to the anterior teeth result in functional, aesthetic and phonetic problems.²Crown discoloration is one of the aesthetic problems associated with traumatic dental injuries. It occurs due to the pulp hemorrhaging as a result of the trauma, in which hemoglobin and erythrocytes are released. The penetration of hemosiderin (pigment originating from hemoglobin) into the dentine can lead to a change in crown color.³

Teeth whitening offers a conservative and aesthetic solution and is an option because it is not invasive, such as crowns or porcelain veneer. The non-vital teeth whitening technique puts the oxidizing agent inside the pulp chamber in direct contact with dentine. Chemicals which are often used as bleach are hydrogen peroxide 35%.⁴Several techniques can be used for restoring fractured teeth, direct composite restorations for crown fractures with missing fragment represents the most minimally invasive method. The aim of this study was to report the management of endodontic retreatment and internal bleaching of a central incisor following dental trauma.

Case Report :

A 25-year-old man was referred suffering from occasional, spontaneous toothache around the maxillary right incisors. He was unable to bite on the tooth without discomfort. When he was 15 years old, he had tripped and fallen onto a post, traumatizing the UR1 and causing an enamel-dentine fracture that did not expose the pulp. About three years after the accident, the UR1 started to become painful to bite on and the gum was sore.

The general dental practitioner root filled the tooth and it settled down. A periapical radiograph was exposed and showed a poor root filling in the maxillary right central incisor and large apical radiolucency in the maxillary right lateral incisors(Figure 3).

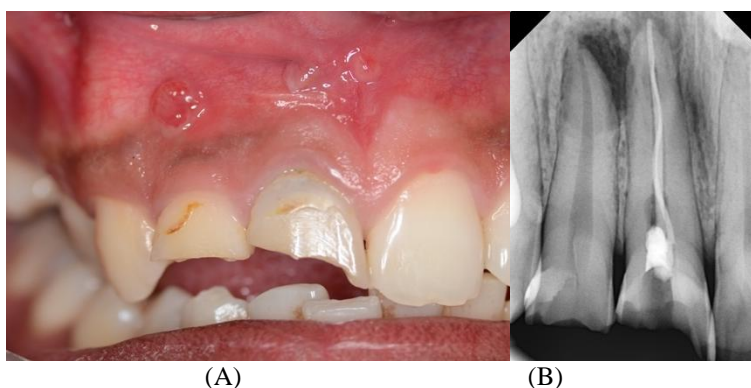


Figure 3. A. Pre-operative labial view B. Pre operative periapicalradiograph

Case Management :

Root canal treatment was performed on tooth 11 and 12. First, the teeth were isolated using rubber dam, then access cavity preparation was performed. The gutta percha was removed using a hedstrom file in the central incisor (Figure 2). An apex locator was used to assess the working length and it was radiographically confirmed (Figure 3).

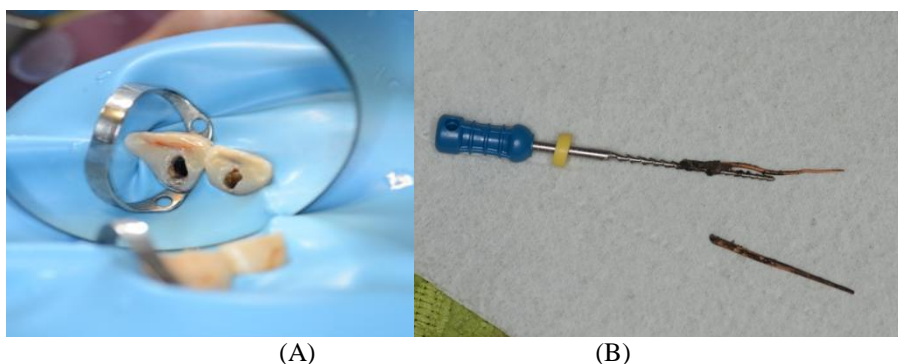


Figure 2 A. Access cavity preparation B. The gutta percha was removed using a hedstrom file

The biomechanical preparation of the root canal was performed using the crown-down pressure less technique. The canal was activated by a sonic activator (Endo Activator, Dentsply) with 5.25 percent sodium hypochlorite (NaOCl) irrigation between the instrumentations. Trial gutta point was performed, and radiographically confirmed (Figure 3). Next, the canal was obtured using gutta percha. Obturation was confirmed radiographically (figure 3) and temporary fillings were placed.

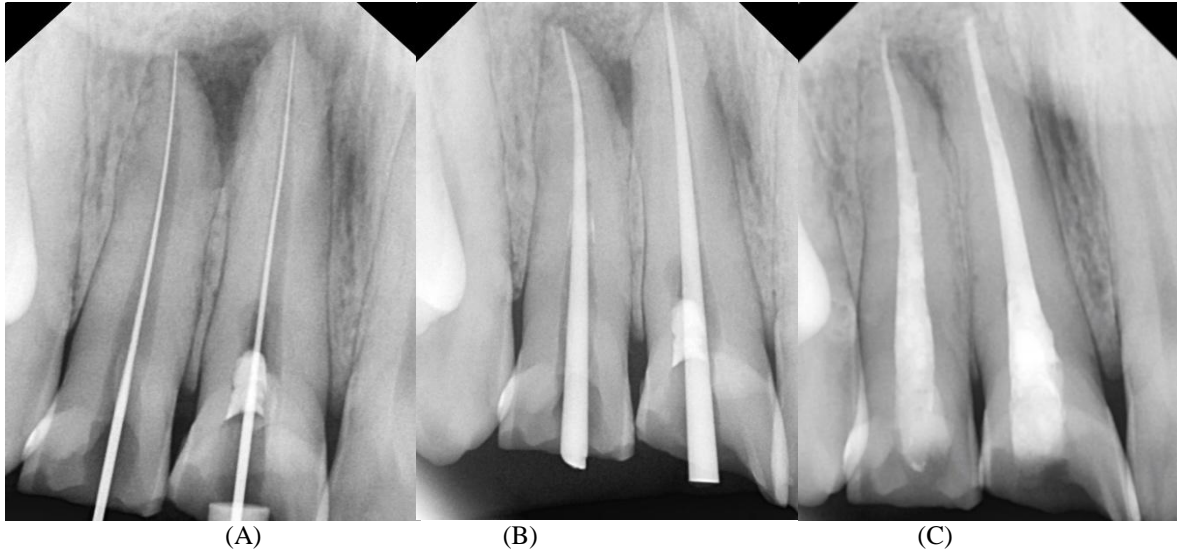


Figure 3. A. Working length confirmation with radiograph B. Gutta percha trial C. Obturation was confirmed radiographically

At the 1-week follow up, the extraoral and intra- oral revealed no symptoms or signs. The color of the tooth (Figure 4) was measured under regular daylight with a Vita 3D shade guide. The tooth was isolated using a rubber dam and removed the temporary fillings. Then, reduction 2mm of gutta percha in above the cemento-enamel junction (CEJ), and flowable composite as a cervical barrier was applied which used ski slope and bobsled tunnel appearance design. Bleaching agents (35% Hydrogen Peroxide) applied into the pulp chamber and light cured temporary fillings were placed.



Figure 4. The color of the tooth was measured with a Vita 3D shade guide.



Figure 5. After 7-days follow up, the discolored tooth had similar color to the adjacent tooth

At the 7-days follow up, the discolored tooth had similar color to the adjacent tooth, checked with Vita shade guide (Figure 5). Temporary fillings were removed. The saline was rinsed and dried in the pulp chamber, calcium hydroxide was added, and placed in the dental chamber for a week until final restoration.

At the 1-week follow up, composite restoration was performed. The tooth was isolated using a rubber dam, 37% phosphoric acid was performed for 30 sec. Then, rinsed with water and dried. Bonding was applied in total etch system and light cured. Fiber reinforced composite applied as a core and permanent restoration was applied using light cured composite. Finishing and contouring done by using soflex disc and polishing done by using soflex disc (Figure 6). Patient satisfied with the result and were asked to come for follow up 1,2, and 12 months.

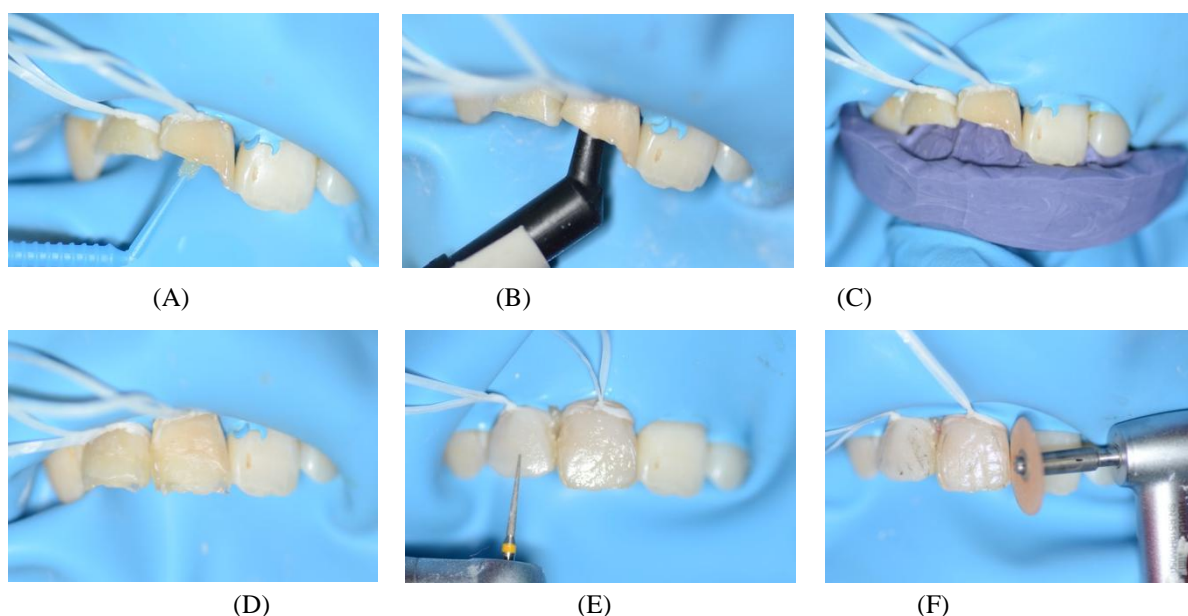


Figure 6. A. Bonding was applied B. Fiber reinforced composite applied as a core C. Palatal guidance D. Composite resin was applied E. Finishing using fine diamond bur F. Polishing using soflex disc



Figure 7. Labial view of before and after treatment



Figure 8. Full faceview before and after treatment

II. Discussion

The International Association for Dental Traumatology (IADT) has produced guidelines for the management of traumatic injuries to teeth (2020).⁵ The recommended treatment for an enamel-dentine fracture is as follows:

1. If a tooth fragment is available, it can be bonded to the tooth. Otherwise, perform a provisional treatment by covering the exposed dentine with glass-ionomer or a permanent restoration using a bonding agent and composite resin
2. The definitive treatment for the fractured crown is restoration with accepted dental restorative materials
3. Three angulations (periapical, occlusal and eccentric exposures) should be used in the radiographic examination to rule out displacement or fracture of the root
4. Radiograph of lip or cheek lacerations to search for tooth fragments or foreign material
5. Follow-up – clinical and radiographic control at six to eight weeks and one year

In this case, the tooth had been traumatised 10 years earlier, tooth become necrotic after injury and the radiolucent area was the result of apical periodontitis. It is important in root canal retreatment to remove the failed root canal filling material as efficiently as possible to allow disinfection of the root canal. Retreatment is considered the primary procedural option when the tooth exhibits inadequate initial root canal treatment, has palpation and percussion sensitivity, localized swelling, recurrent caries, leaky provisional restorations, and substandard or missing coronal restorations.⁶

Tooth whitening following root canal treatment can be carried out using an internal bleaching technique (walking technique) with materials such as sodium perborate, or carbamine peroxide sealed in the access cavity. External root resorption has been related to bleaching of endodontically treated teeth. It may be prevented by placing a orifice barrier. Temporary dressing of the pulp chamber with calcium hydroxide has also been indicated. Placing calcium hydroxide paste into the pulp chamber could increase the pH, thus, inhibiting the osteoclastic activity and increase adhesive capacity of the dentine-bonding agent.

The treatment of the permanent anterior teeth uncomplicated crown fracture considered as class IV composite resin restoration and direct / indirect labial veneer. In this case the patient desired the most conservative and minimally invasive option possible. Composite restorations offer a cost effective treatment alternative where esthetics is a major concern. The survival rates of these anterior composites were reported to be extremely satisfactory even in patients with worn dentition. With improvements in the bonding chemistry and introduction of nanocomposites, it is speculated that the success rate of composites will improve even further.⁷

III. Conclusion :

This case highlights the management of periapical periodontitis in a tooth that suffered dental trauma 10 years previously. Endodontic retreatment done to remove the root canal filling material to allow disinfection of the root canal. Internal bleaching offers conservative approach in whitening discolored tooth without damaging tooth structure and have good aesthetic result. Direct composite restorations for crown fractures with missing fragment represents the most minimally invasive method.

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