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Case Report

Management of a Complicated Crown-Root Fracture in a Single Visit Using Reattachment Technique: A Case Report

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Received: May 14, 2020; **Published:** June 17, 2020

Abstract

Fracture of maxillary anterior teeth are the most common form of traumatic injuries. This kind of traumas may affect the patient both socially and psychologically, so immediate treatment should be carried out. The best treatment is reattachment of the available fractured fragment as this results in original anatomic form and long-lasting esthetics. The aim of this article is to present a case report on management of complicated crow-root fracture by reattachment of the fractured fragment using a prefabricated post to improve adhesion of the fragment with the tooth.

Keywords: *Trauma; Tooth; Fracture Fragment; Reattachment; Pre-Fabricated Post*

Introduction

Trauma to anterior teeth is relatively a very common form of injury. The treatment of any kind of traumatic injury depends mainly on three factors: the extent upto which trauma has occurred, initial care which was provided at the time of injury and lastly the follow- up care taken by the patient and the doctor [1]. The most causes of injuries are falling while running, accidents, acts of violence, and sports [2]. Out of all these injuries it is said that 20 to 60% automobile accidents contributes to injuries to the facial regions [3].

The most commonly affected teeth by trauma are the upper central incisors which accounts for 37% of injuries as compared to other teeth [2]. The anterior teeth can show fracture to enamel, dentin, pulp and cementum. These can be broadly classified under uncomplicated fractures and complicated fractures.[2] The uncomplicated crown fractures are easy to repair but the complicated crown fractures may require immediate attention due to the damage caused to the dentition [4]. 0.3 - 5% are the crown- root fractures and they require a complex and multidisciplinary treatment [5,6].

There are various treatment modalities available for fractured tooth such as composite restorations, use of the fractured fragment, post and core supported prosthesis [7]. These are the least invasive procedures and has a positive emotional and social response from the patient [8].

Purpose of the Study

The purpose of this case report describes the management of crown-root fracture of maxillary central incisor at the cervical region with the help of prefabricated post and core material by reattachment of fractured tooth fragment.

Case Report

A 53-year-old male patient reported to the department of conservative dentistry and endodontics with a chief complaint of mobile tooth in upper anterior region. He gave a history of fall from the motorcycle 24 hours ago. There was no contributory medical history. On through extra and intra-oral examination, there were no injuries to soft tissues of the facial region.

Intra-oral examination of the dentition revealed a complicated crown root fracture of maxillary left central incisor (21) and uncomplicated crown fracture of maxillary right central (11) and lateral incisors (12). The tooth fragment of tooth #21 showed mobility (Figure 1B). The fractured fragment line of 21 was supragingival on the labial side and subgingival on the palatal side (Figure 1A). As the fracture fragment was mobile, the treatment plan decided for the patient was removal of the mobile fragment followed by reattachment of the same fragment with the help of post and core. The patient accepted the treatment plan.

After administration of local anesthesia, the fractured fragment was removed with a help of an anterior extraction forceps easily as it was loosely attached (Figure 1C). To prevent its dehydration and discoloration, the fractured part was kept in distilled water. After this single visit root canal treatment was performed as the radiography did not show any kind of periapical pathosis. Access opening was done and working length was determined by 15 K file (Dentsply Maillefer, Switzerland). The canal was prepared till F3 rotary protaper file (Dentsply Maillefer, Switzerland). The canal was thoroughly irrigated by 2.5% sodium hypochlorite and a final rinse was done by 17% EDTA. F3 paper points (Dentsply Maillefer, Switzerland) was used to dry the canal before obturating the tooth 21 (Figure 2A).

Figure 1: *A) Pre-operative photograph B) Pre-operative radiograph C) Fragment dissociation.*

After completing the obturation post space was prepared with help of peeso-reamers till #3 (MANI). Sufficient amount of gutta-percha was left behind at the apical end as for the guideline of post and core procedure (Figure 2B). A suitable stainless steel post (ParaPost Endodontic Post system, Coltene) was selected corresponding to the #3 peeso-reamer. The fit of the post in the canal was confirmed by taking a radiograph. The post was according trimmed leaving behind 2 mm of the portion out of the canal (Figure 3A). The broken fragment was taken out of the distilled water, washed thoroughly and air dried. A cavity was prepared in the center of the fragment from the cervical end

and was continuously verified for the adjustment of the post which was extending out of the canal. Once the fit of the post and its alignment with the root and the fracture fragment was confirmed, the post was luted into the canal with a dual-core resin (Coltene ParaCore Core Build up). The coronal fragment was then luted and cured by holding it in position (Figure 3C). Oozed out composite was trimmed using a composite finishing burs (Sof-Lex disks 3M ESPE). A postoperative radiograph was taken to check for the proper alignment of post, core material and the fragment (Figure 3B).

Figure 2: *A) Obturation B) Post space preparation radiograph.*

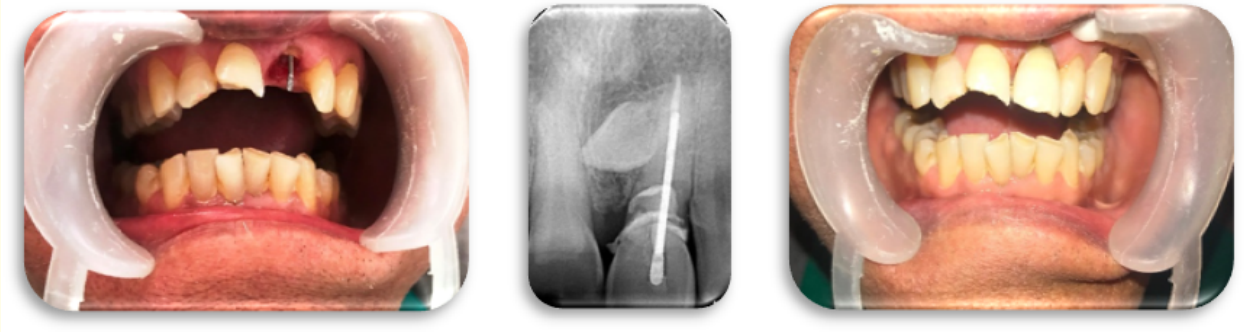

Figure 3: *A) Placement of post B) Postoperative radiograph C) Postoperative photograph after reattachment.*

Postoperative instructions regarding eating habits to restrict loading on the treated tooth was given to the patient. Follow up examination was carried out after regular intervals. Postoperative period was uneventful.

Discussion

Direct trauma leads to crown-root fractures in anterior teeth [9]. This may result in single or multiple fragments which are only attached by periodontal ligament fibers. In most of the cases pulp is involved, further complicating the traumatic injury. The frequency of occurrence reported by Andreasen and Andreasen in a textbook is about 5% of total dental injuries [9]. The case reported in the department was an ideal crown- root fracture with a peculiar feature of chisel-type fracture, with the extension into the lingual gingiva [9].

Depending on the extent of fracture, there are several treatment options available for crown-root fractures [1]. The main aim of any treatment for the traumatized anterior teeth is protection of mechanical and functional integrity. Various treatment options include composite restoration in case the fracture is uncomplicated, reattachment of the fragment in case the fragment is available, post and core supported prosthesis, the fragment removal and orthodontic extrusion and the fragment removal followed by tooth removal [10].

Since the development of adhesive restorative materials, the treatment of fractured teeth has gained newer perspectives. The restorative materials, such as ceramic laminates or crowns, causes unnecessary removal of large amount of tooth structure and also makes the color matching a difficult task [11]. For good esthetic and function rehabilitation, fragment reattachment becomes a simple, fast and conservative technique [12]. Thus whenever the fracture fragment is available, the reattachment is most desired treatment modality. It provides esthetic, functional and cost effective treatment to the patient.

As soon as the fracture segment was removed it was stored in distilled water as proper rehydration has the capability to retain color and fracture strength of the tooth [13,14]. The use of post and core for strengthening endodontically treated teeth is debatable but the use of post for strengthening the reattached fragment is justified [15]. Advances in post materials have been used in dental practice such as glass fiber, quartz and carbon fiber [16]. The post used in this study is a passive cemented parallel- sided stainless steel post. Various studies have shown that these types of pre- fabricated stainless steel post exhibit a higher fracture resistance as compared to other post systems [17]. Another study conducted by Makade CS., *et al.* [18] concluded that stainless steel post with composite core showed the highest fracture resistance as compared to cast post core and glass fiber post. Dual core resin (ParaCore) was used as a core material as it shows excellent physical properties as compared to the other core materials [19]. The macroscopic size of the unidirectional fiber bundles used in fiber reinforces the resins and improves the mechanical properties [20].

The long-term success of treating crown-root fracture depends mainly on the quality of the restorative procedure. Both the loss of significant tooth structure and often the difficulty in restoring normal crown contour contribute to a guarded prognosis.

Conclusion

Complex fractures require an immediate management of the traumatic injury. Tooth fragment reattachment offers a safe, fast, conservative and esthetically pleasing results.

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Volume 19 Issue 7 July 2020