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Reattachment of fractured tooth using fibre post: A case report

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Abstract
Fracture of anterior teeth not only causes pain but affects the patient's esthetics to a large extent. Besides the treatment part, patient cooperation and understanding of the limitations of the treatment is of utmost importance for good prognosis. This clinical case report describes the management of a complicated crown root fracture of right maxillary lateral incisor using reattachment of fractured fragment along with prefabricated post. Successful esthetic and functional results were achieved.

Keywords: fracture, reattachment, fiber post, traumatic injuries

Introduction

Crown fractures are the most common consequences of traumatic injuries that mainly occur in the anterior permanent dentition [3]. It is estimated that dental trauma related to coronal fractures of the anterior teeth are mostly attributed to falls, high-impact sports, and motor vehicle accidents [1, 2].

The majority of dental injuries involves the anterior teeth, especially the maxillary incisors because of its position in the arch. There are a variety of factors which influence the management and outcome of coronal tooth fractures including extent of fracture, presence/absence of fractured tooth fragment and its condition for use, endodontic involvement, biological width violation, alveolar bone fracture, pattern of fracture and restorability of fractured tooth, associated root fracture, soft tissue status, fit between fragment and the remaining tooth structure, occlusion, esthetics, and prognosis [4].

Traumatized anterior teeth requires immediate functional and esthetic repair. Traditionally composite resin restorations are done for such teeth but they have the primary disadvantage of colour mismatch and wear [5]. Therefore the restoration of the tooth using its own fragment, if available, is the better option [6].

Treatment modalities varies from simple reattachment to complex interdisciplinary approach. Treatment alternatives for fractures involving biologic width include crown lengthening, flap surgery, osteotomy /ostectomy and rapid orthodontic tooth extrusion [7].

This case report presents an emergency situation of a female patient with complicated crown root fracture. In this case, endodontic therapy was followed by reattachment of the fractured segment using prefabricated post and composite.

Case Report

A 38-year-old female patient reported to the dental hospital on the day of trauma with a complicated crown-root fracture of the maxillary right lateral incisor caused by domestic fall (Figure 7). The fracture line was oblique extending in apical direction from labial to palatal surface. The margin on palatal surface was located about 2mm from the free gingival margin and was easy to be probed with a periodontal probe. The fractured fragment was attached to the root and to the palatal gingival tissue and was very Mobile. Of the various treatment options explained to the patient, she preferred to retain the fractured fragments. It was planned to perform single visit root canal treatment (RCT) on 12 followed by reattachment with fiber post reinforcement.

Local anesthesia was administered (1.0cc of lidocaine 2% with 1:80,000 epinephrine) and the fractured segment in relation to 12 was atraumatically removed using a forceps. Remnants of pulp tissue from the fractured fragment were removed. It was then cleaned with 2% chlorhexidine solution and stored in distilled water.

Working length was determined, cleaning and shaping was done by using stepback technique, followed by obturation of the canals using lateral condensation technique.Post space was prepared using Peeso reamers, leaving 5mm GP at the apex. Isolation was achieved using cheek retractor, cotton rolls, and suction placed in position. It was necessary to perform an intrasulcular incision followed by a gingival flap for adequate visibility of the fracture margin. (Figure 12) Inorder to control bleeding, gelatin sponge (Ab Gel, Sri Gopal Krishna Labs, Mumbai, India) was packed on palatal surface in the subgingival area.

Esthetic post of diameter 1.1mm (Angelus, Reforpost, Londrina, Brazil) was selected and tried in the canal. It was then cut to the desired length. The fractured fragment was removed from distilled water and tried on the cut end of fiber post. A groove was made on the fractured fragment so that it fits well on the fractured root without any interference from the Post. After confirming the desired fit, it was again stored in distilled water.

The post was then luted with resin cement (3M ESPE Relyx U200 self-adhesive resin cement) with 2mm of its coronal portion extending into the chamber (Figure 13). Excess cement oozing out of canal was removed with cotton applicator tip and then light cured for 40sec. Gelatin sponge was then removed. Self-etch adhesive (3M ESPE Adper™ Easy Bond) was applied on the exposed surface of the tooth as well as in the fractured fragment. The adhesive was air thinned and light-cured for 10 seconds. Groove in the fractured fragment was filled with flowable composite, and

the exposed fiber post was also luted with the same. The fragment was repositioned and cured for 40sec. from palatal, labial, and incisal surfaces.

It was planned to perform orthodontic extrusion of same tooth inorder to bring the fracture line supragingival and to seal any palatal defect, if present. But, the patient was satisfied with the results after two weeks that she was unwilling for any further treatment.

The patient was kept on periodic review and it was observed that both endodontic and restorative treatments remained clinically acceptable through each visit.

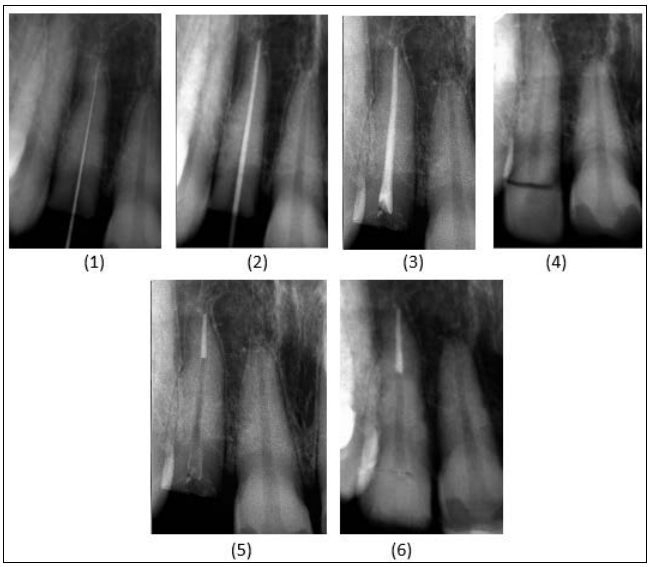

Fig 1: (1) Preoperative radiograph of 12 (2) working length (3) mastercone (4) obturation (5) post space (6) postoperative radiograph after reattachment of fragment

Fig 2: (7) preoperative photograph of 12 (8) palatal view(9) fractured fragment in distilled water (10) post space prepared (11) groove prepared and fit of fibre post confirmed on fractured fragment (12) Gingival flap allowing visualization of the fracture line (13) Post luted on 12 (14)sutures placed (15) Postoperative view

Discussion

Various classification systems have been given for fractured tooth such as Andreasen and Andreasen's classification, Spinas and Altana's classification etc [8]. In the above mentioned case, the fracture was complicated crown-root fracture i.e, fracture of the crown and root involving pulp.

The procedure for reattachment is simpler for supragingival fractures. However when the fracture site is sub gingival, orthodontic extrusion with a post retained crown may be needed. Surgical techniques such as electrosurgery, tissue flap elevation, clinical crown lengthening with removal of alveolar bone and removal of gingival overgrowth for access to the fractured site are all adopted methods for reattaching fractured component [5].

One of the important factors to be considered is the proper hydration of the fractured tooth fragment [3]. Dehydration of the fragment may result in a change in tooth color and a decrease in the fracture strength. Proper rehydration of the fragment helps in restoring both color and strength [9, 10]. In a study to evaluate the fracture resistance of dehydrated and rehydrated teeth over different periods of time, it was found out that dehydration for more than one hour resulted in significant decrease in fracture resistance [11].

In cases with minimal biologic width invasion, restoration the biologic width occurs by itself, provided adequate plaque control is done [3]. In such cases, satisfactory esthetics and function can be achieved, without conventional flap surgery, however requiring long term follow up. It has been suggested that whenever the fracture site invades the biologic width, surgery should be performed with minimum osteotomy and osteoplasty [12]. Crown lengthening is done in certain cases to keep the restorations on definite margins. The prognosis of the reattached teeth would also depend on the fit, contour and surface finishing of the subgingival restoration.

Extensive damage of the tooth structure warrants reinforcement using posts. Historically, cast metal post and core were used for fracture reattachment. Tooth colored fiber posts have several advantages such as aesthetics, bonding to tooth tissue, modulus of elasticity similar to that of dentin and less chances of fracture. By using glass fiber post with composite core and with recent advances in adhesive techniques and materials, a Monobloc, a multilayered structure with no inherent weak inter-layer interfaces can be created [5].

Materials such as composite, dual cure resin or light cured GIC can be used for reattachment purpose [13]. Treatment decisions have to be made individually for each patient considering all the above factors. In addition to obtaining good esthetic and functional result, reattachment technique helps in keeping patient's self-esteem positive due to maintainance of natural tooth appearance.

Conclusion

Dental traumatic injuries could have better treatment outcomes if the public were aware of the need to seek Immediate treatment. Fragment reattachment is a simple, fast, affordable, and esthetically predictable approach in crown fracture cases compared to other treatment modalities such as composite build up or ceramic crowns. So, every attempt should be made to consider reattachment of the fragment, if available, over other treatment options.

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