Management of Anterior Tooth Fracture Using Fragment Reattachment

Nirmal Arcot Padmanabhan Raj, Mathew Thomas, Lijo Isaac, Bhaskaran Srinivasan, Kamala Kannan

ABSTRACT

Anterior tooth fracture is a common form of dental trauma that mainly affects children. This article reports a common type of crown fracture wherein the fracture line extends into the sub gingival area and necessitates the management of its biological width and it management with fragment reattachment using a prefabricated post.

Key Words: Tooth fragment; Reattachment; Prefabricated post

Introduction

The objective of restorative dentistry is to conserve healthy dental tissues while maintaining aesthetics, function and durability. Crown fractures can be classified based on anatom, therapeutic and prognostic considerations. In permanent dentition, crown fractures account for 26-76% of dental injuries. The most common etiologic factors of crown and crown-root fractures for permanent dentition are injuries caused by falls, contact sports, automobile accidents, or the attack of foreign particles on the teeth. This article reports a common type of crown fracture wherein the fracture line extends into the sub gingival area and necessitates the management of its biological width and it management with fragment reattachment using a prefabricated post.

Case Report

A 14 yr old boy with a fractured right maxillary lateral incisor reported to the outpatient clinic. The fracture was found to be protruding in a labio-palatal direction with a sub gingival extension. The patient had come with the fractured fragment partially attached to the crown structure (Figure 1). Endodontic treatment had to be done as it was an Ellis type III fracture with exposure of the pulp. The procedure as well as prognosis was explained to the patient and consent was obtained. The initial steps involved for treating such cases entail the automatic removal of the fragment and its subsequent storage in normal saline (0.5% N, Inven Pharma, India) (Figure 2, 3). A routine root canal treatment was performed using rotary engine driven files (Protaper files, Maillefer Dentsply, USA), and was followed by obturation. The patient was recalled after 2 days for the next stage of treatment. The extent of the fracture line was evaluated and the need for surgical intervention was found to be necessary as the fracture line extended apically to the level of the alveolar crest on the palatal side. Periodontal full thickness flap was raised; osseous re-contouring was done using rotary and hand instruments to make the fracture line supragingival (Figure 4).

The post space was prepared according to standard norms using a Peeso reamer up to size # 4. (Figure 5) A pre fabricated post (EG Post system, Mani, Japan) was selected and the fitting was confirmed using a radiograph. The fragment was taken from saline and held in wet gauze. An opening was made on the palatal side with high speed round bur to accommodate the head of the post, which was then cemented in the canal (Type I GIC, GC Company, Japan). The fragment was subsequently taken off and carefully fitted over the post heads and placed on the remaining tooth structure to ensure conformity of the fit on the labial and palatal side (Figure 6,7).

The fracture margins on both the fragments and the tooth structure were acid etched (37% Phosphoric acid, Meta Etch, Korea) for 20 Seconds, and subsequently washed for 15 seconds. Single Step Bonding Agent (Prime & Bond NT, Dentsply) was applied using a brush over the fractured margins on both the surfaces. A second coat was applied and curing was done (Blue Lux curing unit, Apoza, Taiwan) (Figure 8). A layer of flowable composite (X-Flow, Dentsply) was applied on the fractured margins of the fragment and the tooth structure. The fragment was carefully placed onto the tooth structure and slowly moved into its correct position. A flash of flowable composite indicates proper seating. Curing was done from both labial and palatal aspects for 40 seconds. Flowable composite was placed inside the palatal opened area around the post head and cured (Figure 9). The fracture line was examined and it showed very good approximation (Figure 10).

Discussion

Complicated crown fractures involving the pulp includes 0.9-13% of all dental injuries. Even though there are various treatment options of crown root fractures reattachment of the fragment offers several advantages over other forms of dental restoration as it retains the natural crown and surface morphology, thereby minimizing chair side time. Extensive damage of the tooth structure and missing fragment warrants reinforcement using fiber posts. Tooth colored fiber posts have several advantages. They are more aesthetic when bonded to tooth tissue, modulus of elasticity similar to that of dentin and less chances of fracture. Factors like esthetics and fragment retention need to be considered for long term success. Esthetic problems at the follow up include discoloration or degradation of the composite bonding material at the fracture line which can be masked by using a double chamfer preparation.

A 5 year study revealed that 50% of the lost fragments were primarily due to a new trauma or non physiological use of the restored teeth. Fragment reattachment or restoration with a composite build up form realistic treatment alternatives in young as they allow reasonable deferment of a permanent
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Treatment. The striking advantage of this procedure is that all other treatment options mentioned such as, veneers, crowns, cast core and crown can still be explored, should this treatment fail. Literature reveals that the survival rate of reattached fragments in 5 years was about 50%.\(^9,10\) Hence, fragment reattachment remains the first line of treatment option for the dentist.

**Conclusion**

In conclusion fragment reattachment is a cost effective and an esthetic treatment alternative with the advantages of preservation of original enamel translucency, similar wear rates as compared to the adjacent teeth and minimal chair time.

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**References**


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