

Case Report

Management of an Uncomplicated Crown Fracture by Reattachment: A Minimal Intervention Approach

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ABSTRACT

Aim: Management of an uncomplicated crown fracture in respect to maxillary left central incisor (21) by reattachment technique.

Summary: Anterior crown fracture is a common form of injury that mainly affects children and adolescents. The uncomplicated crown fracture of anterior teeth is the most common traumatic injury of permanent dentition due to the position of the tooth in the oral cavity especially in the maxillary arch. Many treatment modalities have been recommended for the management of such injuries, but if the fractured portion is available and is intact with adequate and correctly preserved margins, the restoration of the tooth using its own fragment offers a viable restorative alternative. Since the development of the adhesive dentistry, reattachment of fractured tooth fragments has been successfully used to restore the fractured tooth. This procedure provides good and long-lasting esthetics, as the original morphology, color, and surface texture are preserved. In this case report an easy and ultra-conservative technique has been used for the management of an uncomplicated crown fracture with minimal tooth preparation.

Keywords: Esthetics, Fracture, Reattachment, Trauma

INTRODUCTION

Coronal fractures of permanent incisors represent 18-22% of all trauma to dental hard tissues amongst which 28-44% are simple (enamel +dentin) and 11-15%, complex (enamel +dentin +pulp). Maxillary central incisors get involved in almost 96% of the cases.^[1] This high incidence can be attributed to the anterior anatomical position and to the protrusion of the tooth during the eruptive process. Children and adolescents may suffer from severe psychological and social trauma due to fractured or missing tooth structure in the aesthetic area of face. The principal objective of the treatment in

such cases is quick functional and esthetic repair. Traditionally such injuries were managed using composite resins. They have the primary disadvantage of colour mismatch and variable wear. Direct or indirect restorations like resin crowns, ceramic crowns and resin composite restorations with and without pins, can be used when the fractured fragment is not available. But, if a broken fragment is available and the fractured portion is intact with adequate and correctly preserved margins, the restoration of the tooth using its own fragment represents the first choice treatment.^[2] This involves the “minimal intervention” and “biological restoration” concept, which aims to achieve maximum preservation of the natural tooth structure and esthetics.^[3]

CASE REPORT

A 13 year old male patient reported to the department of Pediatrics and Preventive dentistry with chief complaint of broken tooth in the upper front tooth region of jaw since 1 day. He had suffered from trauma in the same region due to falling down from bicycle 1 day ago. Intra-oral

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examination revealed an uncomplicated crown fracture in relation to maxillary left central incisor (21). Preoperative assessment and diagnosis revealed Ellis class-2 fracture of 21 [Fig.1]. The tooth gave a positive response on vitality test. No inflammation or edema was associated with gingiva and interdental papilla of the tooth.



Figure 1: Preoperative photograph of patient

The patient brought the fractured tooth fragment stored in milk. [Fig. 2]. The fragment was cleaned with 2% digluconate chlorhexidine, and then kept in 0.9% saline solution to prevent dehydration. The fractured portion was found to be intact, with adequate and correctly preserved margins. It was prepared for reattachment by giving an external chamfer bevel on both the fragment and the tooth. The tooth was isolated with a rubber dam.



Figure 2: Fractured segment of maxillary left central incisor

Prior to the reattachment procedure, the fractured tooth was cleansed and polished. The fractured portion was “tried-in” to check for any disruptions or defects between the remaining tooth structure and the fragment. Acid etching

was done on both the fragment and the tooth using 37% phosphoric acid for 15 seconds and thoroughly rinsed off [Fig. 3]. A bonding agent



Figure 3: Acid etching done on the fragment of the tooth.

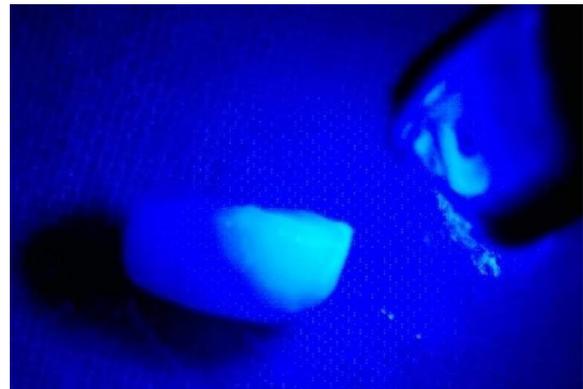


Figure 4: Bonding agent applied to both the substrates and light cured for 30 seconds



Figure 5: Fragment reattachment done in respect to 21

[SINGLE BOND, 3M ESPE] was applied to both the substrates and light cured for 30 seconds [Fig. 4]. Flowable composite [3M ESPE] was used for filling the interfracture space and the fit was reverified. The excess of the material was

removed. Finishing and polishing was done using Soflex discs after fragment reattachment. [Fig. 5]. Patient was then recalled for a follow up on 6 and 12 months. The patient presented with good aesthetics and function on follow ups.

DISCUSSION

The incisal edge reattachment technique offers various advantages like the possibility to re-establish the contour, the architecture and the original brightness of tooth. Since the technique is quick and easy, it reflects a positive emotional response and greater acceptance from the patient.^[4] Excellent results have been achieved with reattachment of dislocated tooth fragments with the advancement in dental bonding technology.

Various problems associated with restorative materials like differential wear, difficulty of contour, unmatched shades and texture reproduction are clearly eliminated by the reattachment techniques.^[5] Some factors that might influence reattachment technique include the extension of fracture, quality of fit between fragments, direction of fracture line and the fracture pattern.^[5,6]

The present case presents with an uncomplicated fracture with fracture line in a favourable direction. The fragment was prepared for reattachment by giving an external chamfer bevel on both the fragment and the tooth. Bevel along with flowable composite improves fracture strength recovery. Many operative procedures have been suggested by literature, from no additional tooth preparation to various preparation options such as: circumferential bevel, internal groove, external chamfer and superficial overcontour of composite on the fracture line.^[7-9]

Reis *et al.* in 2002 reported improved fracture resistance with this additional procedure.^[10] Badami and associates stated that neither the bevel nor the material used could obtain the original fracture resistance of the tooth. They found that specimens prepared with chamfer and bonded had a fracture resistance of 40-60%. Modification of the tooth structure with internal dentin groove and over contour increased the fracture resistance by around 90%.^[7]

Clinical trials have established reattachment as a successful treatment option in many cases.^[11,12] The primary cause of failure of the reattached tooth fragment is a new trauma or the use of the restored tooth with excessive masticatory forces.

CONCLUSION

The restoration of a fractured crown using the adhesive reattachment can be an optimal treatment for an enamel-dentin fracture. The technique is easy to perform, conservative, aesthetic and is inexpensive, when compared to more aggressive prosthetic techniques. The clinical results assured both functional and aesthetic recovery of the patient. Reattachment has proved to be a successful technique in this case for restoring immediate esthetics and function. However because few long term studies have been reported in literature, the patient should be informed of possible interim nature of the treatment.

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