

Reattachment of an Autogenous Tooth Fragment in Complicated Crown Fracture

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ABSTRACT

The occurrence of dental traumas in children is on the rise, according to the literature, and require correct and adequate treatment specific to each fracture in order to preserve the remaining tooth. This article reports a case of a complicated crown fracture of maxillary right central incisor. It describes the reattachment of the original tooth fragment to the fractured tooth, provides benefits of maintaining the tooth's shape, color texture and translucency of the restoration.

Keywords: Complicated crown fracture, Autogenous tooth fragment, Reattachment, Composite.

INTRODUCTION

Dental traumas are of great concern to the dental professionals partly because of the increase in the automobile accidents per year and the increased sports activity. Traumas may cause dental fractures, and depending upon their location, directions and depth relative to the dental pulp and bone tissue, have different classification.¹

Crown fractures account for the majority of dental trauma in the permanent dentition (26-76% of dental injuries).² Dental injuries are more common in childhood. Todd and Dodd showed steady increasing proportions of children with evidence of some accidental damage to their teeth up to the age of 13 years.^{2,3} Peaks in the incidence of injuries have been shown between 2 and 4 years of age of both sexes and again between 8 and 10 years for boys. These peaks relate in the first instance to the toddler stage, infant mobility and later to increasing adventurous games and activities.³ Maxillary incisors are most exposed to these accidents.^{4,5}

There are many ways to treat the different types of traumas. When the tooth fragment is recovered, autogenous reattachment can be performed, using adhesive system and, if required, restoring the fragment/tooth interface with resin composite. Homogenous attachment may also be a viable treatment, employing tooth fragment from the tooth bank stock. In such case, it is mandatory to complete the restoration with resin composite.⁶

Using original fragment to restore crown fracture presents some advantages over composite restorations.^{7,8}

1. The technique is generally faster, economical and less complicated
2. More esthetic restoration could be attained particularly by conserving the original translucency and contours

3. The restored tooth is more resistant to stain and abrasion than a resin restoration.⁹

This type of treatment could be successfully performed when there is a single fragment, which is enough to manipulate, the adaptation of fragment and the tooth is accurate.

The purpose of this paper is to describe a successful, esthetic reattachment of a coronal fragment of a complicated crown fracture of permanent maxillary right central incisor.

CASE REPORT

A 15-year-old boy reported to the KLE VK Institute of Dental Sciences, Belgaum, with a chief complaint of a broken upper right front tooth. The patient gave a history of fall on upper anterior region, 1 day back. The medical and family histories were noncontributory.

On examination the patient was alert with no signs of symptoms of head injury or of neurological damage. There was laceration on the upper and lower lips and chin (Fig. 1). Clinical examination revealed complicated crown fracture on maxillary right permanent central incisor. The fracture line beginning at the mesioincisal edge of maxillary right central incisor and following oblique course towards the distocervical end of the tooth both labially and palatally was observed (Fig. 2). The fractured fragment was attached to the tooth at distocervical end palatally. The tooth did not respond to thermal or electrical pulp testing. Periapical radiograph showed a fully formed apex, and interrupted lamina dura at the apical-third of the root with no appreciable bone loss (Fig. 4).

Local anesthesia was obtained with 2% lidocaine with 1:80,000 adrenaline, the tooth fragment was separated from the remaining tooth at palatal region by means of a high speed handpiece with air and water and a tapered fissure bur (Fig. 3).



Fig. 1: Extraoral photograph when patient reported at the clinic



Fig. 4: Preoperative radiograph when patient reported at the clinic



Fig. 2: Intraoral photograph showing fractured fragment attached to tooth



Fig. 5: Postobturation radiograph



Fig. 3: Detached tooth fragment

The fragment was tried against the fractured tooth, it approximated precisely with no enamel defect. It was decided to perform root canal treatment followed by reattachment of the tooth fragment. In the meanwhile, the tooth fragment was

stored in normal saline for the purpose of rehydration till the completion of root canal treatment.

Endodontic treatment was rendered in routine manner. Access cavity was obtained, chemomechanical preparation was completed and obturated with gutta-percha and access cavity was temporized with glass ionomer cement (GC Gold Label, Japan) (Fig. 5). The patient was given postoperative instructions for a soft diet, careful and meticulous oral hygiene and amoxicillin 500 mg tid for 5 days.

One week postobturation the patient reported with asymptomatic tooth. The fragment was tried against the fractured central incisor for evaluation of fit and color. The tooth fragment and fractured tooth was acid-etched for 15 seconds using 37.5% phosphoric acid gel (Kerr gel etchant, Italy) (Fig. 6). Dentine bonding agent (Prime Dent Light cure Dentin/Enamel Bonding resin, USA) was applied and cured for 20 seconds (Fig. 7). Composite resin (Prime Dent Visible Light Cure Composite, USA) was placed between the tooth fragment and tooth, and cured for 20 seconds (Fig. 8). Finishing and polishing was completed (Fig. 9). The patient is on regular check-up after every 3 weeks. After one year follow-up patient

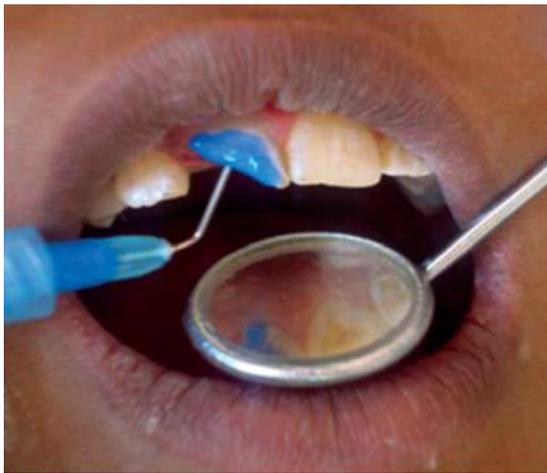


Fig. 6: Acid etching



Fig. 9: Final restoration



Fig. 7: Application of dentin bonding agent



Fig. 8: Reattachment of fracture fragment and application of composite resin

did not show any adverse reactions and patient is asked to come for regular follow-up every 3 months.

DISCUSSION

The treatment of tooth fractures is a challenging task for the dentist. In the complicated crown root fractures, when the decision has to be made to maintain pulpal vitality, especially

in children with incompletely formed apices, the type of treatment depends on several factors including the time elapsed and the size of the exposure.

The treatment options available include pulp capping, pulpotomy and root canal treatment.^{5,10,11} Pulp capping, where the exposure is covered by calcium hydroxide, or more recently by mineral trioxide aggregate, is indicated when there is a small exposure that can be treated within 24 hours of injury.^{5,9-11} Pulpotomy involves removal of the inflamed tissue to the level of healthy pulp and dressing the pulp with calcium hydroxide. Root canal treatment is performed in cases of mature teeth where conservative pulp therapy is not indicated.^{10,11} In young patients, the risk and benefits of each treatment option should be carefully evaluated in making a treatment decision, with consideration of the patient's age, root development stage, eruption potential and the patient's guardian/parent's preference.⁷

The technique described in this case report is simple, quick and restores the tooth's function and esthetics. This dental reattachment technique has been widely accepted with the development of acid etching and dentin adhesives.^{5,6,9} Moreover, it is advantageous because it is simple and fast technique that produces good esthetic and functioning results that are long lasting. It also requires only a thin layer of resin composite to restore the original form and color of the tooth.⁹

The technique used here was bonding adhesive system, which is indicated in cases where the fragment has good adaptation to the tooth remains with no need to increase retention and improve esthetics.^{10,12}

Autogenous reattachment is more advantageous than homogenous attachment because it provides better fragment adaptation to the remaining tooth, good stability, color fidelity and increased patient satisfaction, since the natural appearance of tooth is achieved.⁹ Thus, it is superior to the composite resin restoration. The attached fragment acts as temporary restoration which is highly conservative and potentially durable and the permanent restoration could be planned later. The patient was kept under periodic evaluation, radiographically and clinically to determine the status of the tooth and periapical tissues. A

permanent porcelain jacket crown was planned after the eruption of all teeth.

CONCLUSION

Traumatic injuries have a marked influence on the esthetic, physical and psychological development of an individual. Also with the improvement in the bonding agents and restorative resins, better and long lasting results may be obtained in reattachment technique. Hence, the patient's guardians/parents must be informed about the reattachment procedures and should be advised to keep the fragments after any kind of trauma.

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REFERENCES

1. Regina G, Carla M. Autogenous tooth fragment reattachment— Association of periodontal surgery and endodontic and restorative procedures: A case report. *Quintessence Int* 2004;35(3):179-84.
2. Steven O, Thalia J, Ivo K. Crown fractures in the permanent dentition: Pulpal and restorative considerations. *Dent Traumatol* 2002;18:103-15.
3. Rebecca J, Prabhu N, Munshi A. Reattachment of a fractured maxillary incisor crown: Case report. *Ind Soc Pedo Prev Dent* 1998;17-20.
4. Hunter ML, Hunter B, Kingdon A, Addy M, Dummer PM, Shaw WC. Traumatic injury to maxillary incisor teeth in a group of South Wales school children. *Endo Dent Traumatol* 1990;6: 260-64.
5. Rapelli G, Massaccesi C, Putignano A. Clinical procedures for the immediate reattachment of a tooth fragment. *Dent Traumatol* 2002;18:281-85.
6. Nogueira FG, Machion L, Teixeira FB, Pimenta LA, Sallum EA. Reattachment of an autogenous tooth fragment in a fracture with biologic width violation: A case report. *Quintessence Int* 2002;33:181-84.
7. Turgut MD, Gonul N, Ataly N. Multiple complicated crown-root fracture of a permanent incisor. *Dent Traumatol* 2004; 20:288-92.
8. Ataly N, Gungor HC. A retrospective study of dentoalveolar injuries of children in Ankara, Turkey. *Dent Traumatol* 2001;17:201-04.
9. Garcia-Gody F, Pulver F. Treatment of trauma to the primary and young permanent dentitions. *Pediatr Dent* 2002;44:597-631.
10. Andreasen JO, Andreasen FM. *Essentials of traumatic injuries to the teeth* (1st ed). Copenhagen: Munksgaard 1994:28-35.
11. Antoniella B, Diane E. Tooth fragment reattachment in multiple complicated permanent incisor crown-root fractures: A report of two cases. *Dent Tramadol* 2008;24:248-52.
12. Farik B, Munksgaard EC, Kreiborg S, Andreasen JO. Adhesive bonding of the fragmented anterior teeth. *Endod dent Traumatol* 1998;14:119-23.