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Case Report

Biologic approach for fragment reattachment: a case report

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ABSTRACT

Crown fracture is most reported dental injury in maxillary anterior region with uncomplicated crown fractures in anterior region are most involved in adolescents and children. A 10-year-old boy reported to the Department of Paediatric and Preventive Dentistry with a chief complaint of fractured upper left front tooth region and gave history of fall 2 hours back and he was carrying a fractured fragment along with him. Clinical and radiographical examinations revealed Ellis class II fracture in maxillary left anterior region. After considering all other treatment options fractured fragment re-attachment with light cure composite resin was finalized as a treatment option.

Keywords: Trauma, Biologic reattachment, Esthetics

INTRODUCTION

Trauma in dental injuries is a worldwide public dental health problem with several treatment options and interventions available depending upon the type of traumatic injury.[1] In literature, the incidence of dental injuries in children lies between the range of 1-3% in the population and upto 12 years of age it shows highest incidence per 1000 individuals, and it gets lower in higher ages. Boys are more commonly injured as compared to girls. According to the research, prevalence of trauma varies within countries, in US and UK prevalence lies between 14.4 and 16% in 6-20 years old and 23.7 and 44.4% in 11-14 years age group respectively. In other countries like, Europe, Middle East and Asia the prevalence varies between 13.5 and 20.3% in 6–24-year age groups, 16.2 to 32% in 8–16 years old age groups.[2,3]

Crown fracture is most reported dental injury in maxillary anterior region with uncomplicated crown fractures in anterior teeth are more commonly involved in adolescents and children. Main cause of these kind of fractures are boxing, basketball, hockey, and fall.[4] Due to position of the tooth, central incisors are most frequently involved tooth whereas maxillary lateral incisors and mandibular central incisors are less involved. Dental injuries usually affect single tooth whereas any other trauma like sports injuries or automobile accidents involve multiple teeth.[5] Several treatment modalities have been used in past few years to treat fractured tooth like full coverage restorations or reattachment of fractured tooth fragment.[6]

Fragment reattachment is the most desirable option when it is available as it is a biologic and highly conservative approach with minimal tooth preparation, aesthetic and there is no or minimal violation of biological width.[7]

CASE REPORT

A 10-year-old boy reported to the Department of Pediatric and Preventive Dentistry with a chief complaint of fractured tooth in upper left front tooth region. Patient gave history of fall from staircase and came 2 hours after the accident. No other medical history was reported by patient. He was carrying a fractured tooth fragment along with him in a box (Figure 1). Clinical examination revealed Ellis class II fracture in maxillary left central incisor (#21) (Figure 2). Minor bleeding and lacerations were observed under the lip region, it was cleaned with sterile gauge and chlorhexidine, metronidazole and lignocaine gel was applied (Figure 3). After considering all the advantages, disadvantages, prognosis and based on patients and parents

choice of immediate replacement, re-attachment was finalised as a treatment option.

Fractured tooth fragment was kept in normal saline till the time it was reattached. Internal dentine groove technique for fragment reattachment was used by preparing dentinal groove (1 mm deep and 1 mm wide) in the fractured fragment and tooth before reattachment for better adaptation and to get a fracture strength recovery with respect to sound tooth. Fractured fragment was etched with 37% phosphoric acid as well as tooth was also etched for 15 seconds. Proper rinsing and drying was done, primer was applied followed by curing. Light cure composite resin was used to attach the fractured fragment with remaining tooth structure and photo polymerization was done (Figure 4). Finishing and polishing was done appropriately (Figure 5).

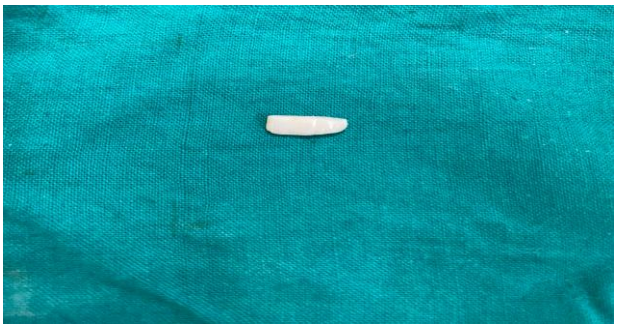

Figure 1: Fractured tooth fragment of maxillary left central incisor.

Figure 2: Clinical examination reveals Ellis class II fracture.

Figure 3: Minor lip lacerations.

Patient was instructed to maintain oral hygiene status by brushing twice a day and using of mouthwash, avoid sticky and hard food substances also. Post-operative follow up of after 1 week, 1 month and 3 months was satisfactory with patient showing no adverse signs and symptoms and tooth and peridontium healing uneventfully.

Figure 4: Fragment reattached.

Figure 5: Post operative view of reattached fractured tooth fragment after polishing.

DISCUSSION

Falls from accidents are found to be the most common cause of pediatric dental trauma. Deepika et al concluded in their study that primary etiological factor for dental trauma is accidental fall in children of all age groups followed by sports injury, it was also recorded that 92.3% of sports injuries were seen in 12-16 years of age group. Most common type of traumatic dental injury is Ellis class IV fracture and permanent dentition in children with male preponderance.[8] Antipoviene et al conducted a retrospective patient register study in the year 2018 and included patients under 18 years old and collected information of 407 children.[9] They examined all patients background, type of TDI, complications, cause of injury, treatment and time of injury to visit to the dentist and concluded in Table 1.

In our case of uncomplicated crown fracture – an enamel dentin fracture without pulp involvement, it is diagnosed by loss of tooth structure clinically and/or radiographically restricted to enamel or to enamel and dentin both and the treatment was done as per AAPD protocol. Objective of treatment is to maintain the vitality of the pulp and restore normal form and function. To evaluate tooth fragments -

injured lips, gingiva and tongue should be examined. Rough margins and edges can be smoothed in case of in case of small fractures and lost tooth can be restored in case of larger fractures. General prognosis of uncomplicated crown fractures mainly depends upon the concomitant injury to periodontal ligament and secondarily upon the extensiveness of dentin exposure.[10]

Chosack and Eidelman reported first fragment reattachment and Andreasen et al conducted a multicentre study of reattachment of central incisor and reported that after 5 years and 7 years follow up 50% and 25% of the teeth remain intact.[5,9,11] Several authors proposed different techniques of reattachment such as simple reattachment, V-shaped notch bevel, modified Simonsen's technique and the internal dentinal groove that was used in our case with equal resonance of success.[12] 27% direct restoration without any endodontic treatment among Turkish children permanent teeth was a sucessful outcome in the study conducted by Unal et al.[13] In the present case, conservative approach was acquired for re-attachment of anterior tooth fragment with the use of light cure composite resin without Root canal treatment because there was no pulp exposure seen. Ajayi et al concluded in the study that survival rate of fragment re-attachment is fair enough.[14] Further studies recommended that survival rate of this type of restoration is good.

Table 1: Sequelae of traumatic injury.

Categories	Characteristics
Background information	Age (0–3, 4–8, and 9–17 years); gender (boys, girls); place of residence (urban, rural)
Cause of traumatic dental injury	Falling, cycling, playing, fighting, other
Traumatized tooth	The type of traumatized tooth in upper or lower jaw. Permanent premolars and molars were combined into two categories: upper posterior and lower posterior. Primary first and second molars were combined into two categories: upper posterior molars and lower posterior molars
Type of trauma according to Andreasen et al	Fractures: enamel infraction, enamel fracture, enamel-dentine fracture, enamel-dentine-pulp fracture, uncomplicated crown-root fracture (without pulp involvement), complicated crown-root fracture (with pulp involvement), root fracture, alveolar fracture. luxations: concussion, subluxation, extrusion, lateral luxation, intrusion, and avulsion
Time elapsed from injury to first visit to the dentist	Within an hour, 1–7 hours, the day after TDI, 2–6 days after TDI, 1 week or more after TDI
Treatment method	Restoration (GIC, composite), pulp capping (Ca(OH) 2; MTA); pulpotomy; root canal treatment; tooth splinting; tooth extraction; and orthodontic extrusion of a traumatically intruded tooth
Complications	Marginal periodontitis, pulp necrosis, chronic periapical periodontitis, root canal obliteration, abscess formation, external root resorption, and internal root resorption

TDI: traumatic dental injury; GIC: glass ionomer cement; MTA: mineral trioxide aggregate.

Many case reports used various techniques and materials for re-attachment of fractured tooth fragment have also been published (17% dual cure composite, 29% - flowable composite and 54% - light cure composite). Composite plays important role in list of restorative materials due to its properties such as aesthetics, conservation of tooth structure and micromechanical bonding. Sarapultseva et al reported simple re-attachment success of 37.1%, buccal chamfer 60%, contour bonding of 97% and internal groove of 90% success rate. They also concluded that survival rate of 88.9% was seeen in biologic method of tooth fragment re-attachment.[15]

CONCLUSION

Tooth fragment re-attachment is feasible and appropriate treatment option in case of tooth fracture in anterior region (complicated or uncomplicated) depending on the availability of the fragment. It can be considered as an alternative treatment option due to its simple, aesthetic, cost effective and conservative approach.

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