Case Report

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Preserving the Natural: A Case Series and Review of Reattachment Procedures

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ABSTRACT

Background: Coronal tooth fractures are a common occurrence in children and their treatment procedures should restore esthetics and function of the tooth. Whenever the clinical situation permits, bonding of fractured fragment should be considered because it can provide optimal esthetics and positive psychological response. It also maintains the natural appearance, translucency and physical properties of the tooth.

Keywords: Traumatized teeth, Fractured fragment reattachment, management of traumatized teeth.

INTRODUCTION

Traumatic dental injuries are commonly seen in children. The average incidence of injuries to anterior teeth reported in literature ranges from 4-46% with 11-30% in primary dentition and 6-29% in permanent dentition[1].. Various factors affect the management of tooth fractures, including extent of fracture (biologic width violation, endodontic involvement, alveolar bone fracture), pattern of fracture and restorability of fractured tooth, secondary trauma, presence of absence of fractured fragment, occlusion, esthetics and prognosis [2,3]. In cases of minimal or no biologic width violation, reattachment of fractured fragment provides optimal esthetic solution with a positive psychological response [4]. One of the current treatment options available for restoring fractured teeth is composite resin restorations. Although composites are esthetically satisfying, their optical properties and colour stability are still not exactly as that of natural tooth structure.

Chosack and Eidelman[5] were the first to attempt fractured fragment reattachment procedure in a traumatized incisor. Since then, numerous cases have been reported including the ones by Tennery NT[6], Starkey [7], Simonsen RJ [8] and Murchison DF[9]. The clinical procedure of reattachment has evolved over the last few decades from use of composite resins to fibre post and core[10]. This article reports two cases of fragment reattachment including one in a traumatized young permanent tooth.

CASE REPORT 1

A 9 year old girl reported to the Department of Pedodontics and Preventive Dentistry, Army College of Dental Sciences, Secunderabad with a fracture of maxillary right central incisor and swollen lower lip after falling from the bed the previous night. She reported to the department 8 hours after the injury. Extra-oral examination showed swollen lower lip and bleeding from laceration wound on oral surface. Intraoral clinical examination revealed Ellis class III fracture

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through the middle third of maxillary right central incisor with pulp exposure. No mobility was observed and the tooth was sensitive to percussion. Radiological examination revealed immature apex of maxillary right central incisor. No associated root fracture was observed. The presence of fractured fragment was confirmed in the lower lip by radiograph.

Fig 1: Preoperative Case 1.

Fig 2: Pre-operative radiograph Case 1.

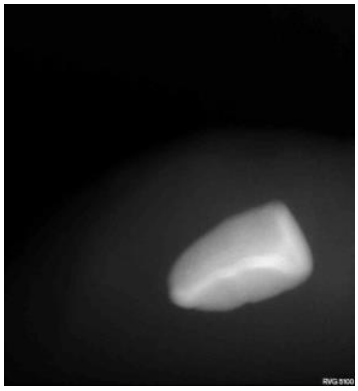

Fig 3: Radiograph of lower lip showing fractured fragment.

First the fractured fragment was removed from the lower lip under local anaesthesia, and stored in saline. Then maxillary right central incisor was anesthetized, isolated and superficial pulp tissue was gently removed with a sharp sterile spoon excavator and bleeding was controlled with moist cotton pellets. Calcium hydroxide pulpotomy was performed followed by glass ionomer restoration till the cementoenamel junction. Later Non rinse conditioner from the Resin cement kit (Ivoclar-Vivadent) was applied on the tooth surface and bonding surface of fractured fragment for 10 seconds and then air-dried. Bonding agent A and B of the kit were mixed in the mixing well and applied on the bonding surfaces of tooth and fragment. It was air-thinned and cured for 10 seconds. Resin cement was applied on the tooth surface and the fractured fragment and held in close proximity before curing for 20 seconds both from labial and palatal sides.

Fig 4: Post-operative. Case 1

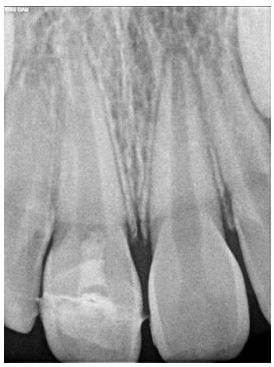

Fig 5: Post-operative. Case 1

The patient was recalled after 24 hours, 1 week and then at 2, 4 and 6 months and evaluated clinically for signs of irreversible pulpal damage and radiologically for root lengthening and apical

closure. At 9 months follow-up, the radiograph showed increase in root length and slight apical closure.

CASE REPORT 2

10 year old boy reported to the Department of Pedodontics and Preventive Dentistry, Army College of Dental Sciences with a chief complaint of broken upper front left tooth after 20 days of sustaining sports injury with a cricket ball. Clinical examination revealed vertical crown fracture in relation to laft maxillary central incisor extending apically to CEJ. The fragment was attached to the gingival tissue. There were no associated soft tissue injuries. Electric pulp testing did not elicit any response from the tooth.

Fig 6: Pre-operative. Case2

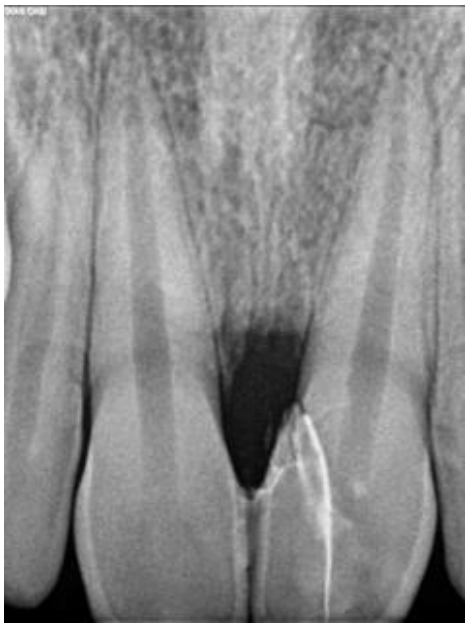

Fig 7: Post-operative Radiograph

Fig 8: Post-operative. Case 2

Fig 9: Post-operative Radiogrpah. Case 2

Thus, root canal treatment was initiated in the tooth and the fractured fragment was reattached with resin cement (Ivoclar-vivadent) in the same sitting to ensure proper seal while root canal treatment was being carried out. The fragment and the tooth surface were etched with 37% phosphoric acid for 15 seconds and thoroughly rinsed off. Bonding agent (ADPER SINGLE BOND2, 3M ESPE) was then applied to the tooth surface and light-cured for 15 seconds. Dual cure resin (Rely-X, 3M) was placed on the tooth surface and inner surface of the coronal fragment and both were aligned in the original position. Excess cement was removed and the area was light cured for 40 seconds, ensuring that no displacement had occurred. Proper finishing was done with diamond burs and tooth was polished with a series of Sof-Lex disks (3M ESPE) and diamond polishing paste. Occlusion was assessed and closed dressing was given. The root canal treatment was completed in

the next sitting. Instructions were given to avoid undue pressure on the tooth and to maintain proper oral hygiene. Subsequent follow-up was done at 1, 3 and 6 months and the treatment was found to be clinically and radiologically stable.

DISCUSSION

Maxillary anterior teeth are more susceptible to fractures owing to their position in the arch. Anterior teeth trauma associated with coronal fracture results in psychological and functional distress to a young child. Restoring the esthetics in the most natural way by reattachment of the fractured fragment stimulates a positive psychological response in the patient, along with restoring function optimally. As mentioned earlier, other modalities to treat coronal fractures of anterior teeth include composite restoration, metal or glass fibre post and core restoration followed by jacket crown etc.

The composite resin has a favorable subgingival reaction and the formation of junctional epithelium and connective tissue adjacent to subgingival restorative materials in humans[11] but it may not provide optimal shade matching and translucency. Bonding of original fragment permits subgingival healing with long thick functional epithelium. Also, prosthodontic rehabilitation in younger patients requires considerations of pulpal proximity, progressive eruption and gingival margin instability. Thus, reattachment of fractured fragment seems a safe procedure. Although the prognosis and longevity of a tooth fragment reattachment is not ascertainable, the real advantage of reattachment procedure is that the clinician will still be able to make use of other restoration options like crowns, adhesive resins etc, if need be. With advancement in dental bonding technology, it is now possible to achieve excellent results with reattachment of fractured tooth fragments, provided that the biologic factors and selection of materials are logically assessed and managed. The clinician must consider that a dry and clean working field and proper use of bonding protocols and bonding materials are the key to achieve success in adhesive dentistry.

In first case, pulpotomy was carried out as the child reported early after the trauma and on exploration, uncontrolled bleeding from the pulp was not observed. The tooth will be followed up till apical closure is complete. In traumatized young permanent teeth, every treatment modality should aim at preserving pulp vitality to assist in physiological root end closure. In the second case, the tooth had become non-vital due to trauma and thus conventional root canal treatment was done. the fractured fragment was attached in the first sitting itself to prevent microleakage until root canal treatment was completed.

Reattachment of the original tooth fragment offers leverage over other restorative methods in terms of the tooth colour, contour, incisal translucency and occlusal contacts[12]. In reattachment procedures, multidisciplinary approach to crown root fracture is needed with periodontal, endodontic, restorative and occlusal considerations. Follow-up is of critical importance in such cases and during each follow-up visit, the clinician should assess the tooth both clinically for esthetics and radiographically for periodontal status of the tooth.

CONCLUSION

This case series emphasizes on reattachment of fractured fragment as a conservative approach to management of fractured anterior teeth as it is a simple and efficient alternative for restoring the esthetics and function and also for psychological benefit of the patient.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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