Management of complicated crown fracture by reattachment technique: A clinical report

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ABSTRACT

Anterior crown fractures area common form of traumatic dental injuries that mainly affect the maxillary central incisors, in children and teenagers. Since the development of the adhesive dentistry, many case reports of crown fractures restored using adhesive reattachment techniques were published. This article reports management of one coronal tooth fracture case that were successfully treated using tooth fragment reattachment on palatal aspect especially along with the use of adhesive resins for coronal build up.

Key words: Adhesives, Coronal Fracture, Reattachment

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INTRODUCTION

Uncomplicated and complicated anterior crown fractures area common form of injury that mainly affects children and adolescents and most commonly affected teeth by trauma are the maxillary incisors, with a reported share of 96% of all the crown fractures (80% central incisors and 16% lateral incisors). The eruptive pattern of maxillary incisors and their position in the arch is attributable for the risk of trauma. Andreasen has classified crown fractures as enamel infractions, enamel fractures with little or no dentin involvement, enamel-dentin fractures with no pulp involvement (uncomplicated crown fractures) and enamel-dentin fractures with pulpal involvement (complicated crown fractures).[1]

The high prevalence of fractures in permanent anterior teeth in young patients often represents a challenge for achieving esthetic dentistry quickly and conservatively.[2] Improvements in adhesive dentistry have enabled a conservative approach by reattachment of the fragment when it is present or reconstruction with composite resins.[3,4] Although composite resin restoration is indicated in the management of fractured anterior teeth, reattachment is an excellent option when the fragment is available.[5] Depending on the extent of the fracture, tooth fragment re-attachment might be unfeasible.[6] The level of fracture is an important factor in the determination of treatment, especially when the dentogingival complex is compromised.[7] The reattachment of the fractured crown fragments using the bonding fragment technique offers several advantage including the re-establishment of function, esthetics, shape, shine and surface texture in a short ime, there by preserving the original contour and alignment of dental tissues.

Presented herea case of Ellis Class III fractured tooth managed with reattachment of the palatal fractured tooth segment followed by esthetic consideration.

CASE REPORT

A 10-year-old boy, sustained trauma in his maxillary right central incisor (11) due to hit on the desk of his school, had reported to our department. No significant hard or soft-tissue injury, other than tooth fracture, was observed.

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The intra oral examination and radiological examination revealed a complicated crown fracture (Ellis Class III fracture) without any evidence of fracture in root. Clinical examination evidenced a fracture involving the enamel/dentin with pulp exposure and mild tenderness was noted. The coronal fractured portion (middle 3rd) was missing and additional fracture pattern on the palatal aspect extending subgingivally on the tooth was noted [Figure 1a and b].

The position and pattern of the palatal fracture suggested that reattachment of the palatal fragment to its original position using adhesives procedures as a first step followed by endodontic therapy and composite buildup of the remaining coronal portion was a reliable option for the case.

After adequately anesthetizing and isolation the tooth, the fractured palatal fragment of the tooth was removed slowly [Figure 2a and b] and stored in normal saline for 15 min. Mild bleeding was observed, which was controlled with wet cotton pellets and manual pressure. The next step was to etch the fractured tooth end sand the palatal fragment with a 37% phosphoric acid etchant for 15 s and rinsed thoroughly with water, the tooth was dried and a dentin bonding agent was applied over them and light cured for 20 s as per manufacturer's instructions. The fractured fragment was then exactly approximated over the tooth to its original position keeping in mind not to displace the fragment during the curing period and light cure composite resin material was applied, which was photo-polymerized for 40 s [Figure 3]. The final step was to finish and polish. After the reattachment step was completed, root canal treatmentof 11 was carried out by conventional method [Figure 4].

Post-space was prepared in the root canal removing gutta-percha of approximately 2 mm outside the chamber from its coronal portion. Composite resin itself is inserted into the canal to use it as a post and finally composite buildup of the remaining fractured portion of the crown is carried out foresthetic purpose. Final finishing and polishing of the tooth was done with composite polishing kit [Figure 5].

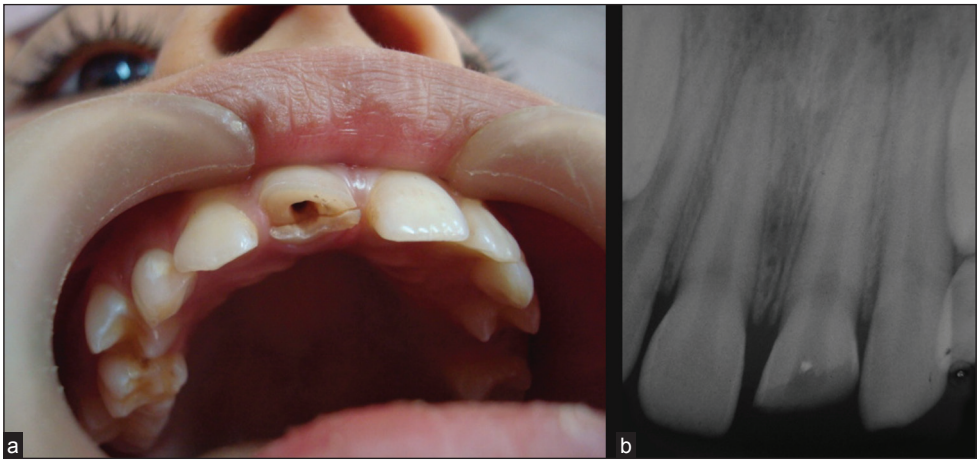

Figure 1a and b: Pre-operative view

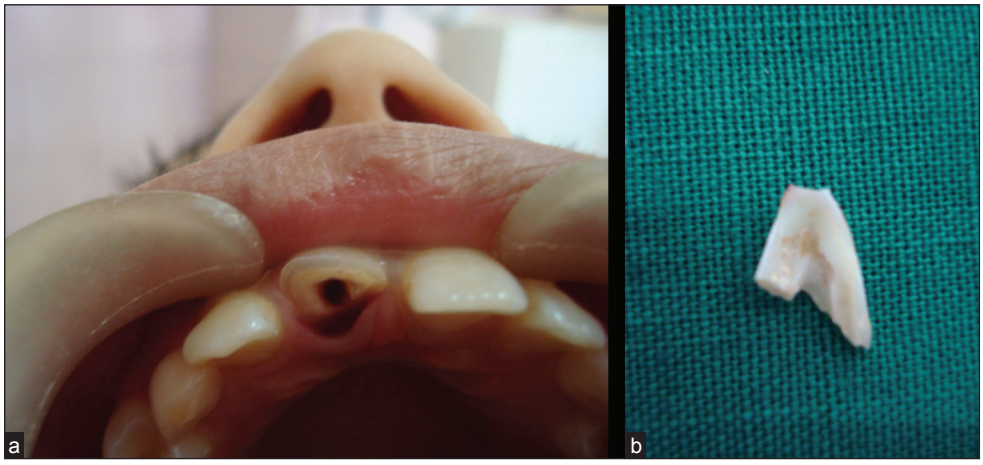

Figure 2: (a) Palatal view after fractured fragment removal, (b) Fractured fragment

Figure 3: Fractured segment reattached

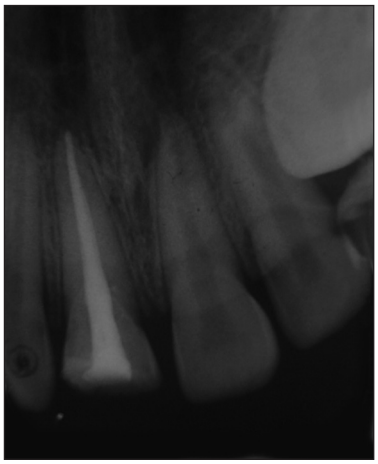

Figure 4: Intraoral periapical radiograph after root canal treatment

Figure 5: Post-operative view

Post-operative instructions were given. Patient was recalled for follow-up at an interval of 1 month, 3 months and 1 year, but unfortunately they did not turn up for follow-up in next 3 months and 1 year. The tooth was found to be intact and functional inside the oral cavity ininitial first visit and the marginal integrity was intact with no crazing.

DISCUSSION

Trauma to maxillary anterior teeth is of most common occurrence. Various treatment modalities have been described for the management of the fractured teeth. They include: Fragment removal followed by restoration, fragment reattachment, orthodontic extrusion with/without gingivoplasty, forced surgical extrusion, vital root submergence and extraction followed by implants.[8-10]

Loss of the coronal part of a permanent incisor in a young patient can cause esthetic and functional problems, which in turn can lead to severe emotional problems. Alternative treatment modalities must be considered. Extraction must not be the first treatment choice for fractured and extremely broken down, young, permanent teeth in the anterior region.[11] Whenever possible, reattachment of the fractured tooth segment is one of the best techniques for the restoration of a fractured anterior tooth.[12,13] It is esthetically more predictable for translucency, opalescence, fluorescence, characterizations and texture of the surface. In addition, it is less time consuming compared with other direct and indirect restorations. The rate of wear and abrasiveness is the same as that for the intact tooth while composite resin will be abraded more quickly than enamel by the opposing dentition. Moreover, the technique also restores stress resistance comparable to intact tooth tissue and thus, in case of further dental trauma, is preferable to composite restoration.[14]

In this case as the major fractured fragment (middle3rd) of the tooth was missing, composite build was the only alternative option;however, the reattachment of the remaining palatal fragment was also feasible to increase the lifespan of the tooth.

Extensive damage of the tooth structure and missing fragment warrants reinforcement using fiber posts. Here, in our case as the major bulk of the crown structure was present, the need of fiber post was eliminated and composite resin itself was used as post for better retention. The flowable composite reinforces the tooth, helps in achieving higher bond strengths and minimizes the inclusion of air voids.[15]

Alternative treatment option for such cases could be orthodontic extrusion of the tooth in providing for esthetic and functional restorations, but again the treatment time for the orthodontic extrusion is a drawback and the image-conscious patient may not want to wait for a definitive esthetic restoration following orthodontic treatment. The prime objective of orthodontic extrusion

is to provide both a sound tissue margin for ultimate restoration and to make a periodontal environment (biologic width) that will be easy to maintain.[16]

With the materials available today, in conjunction with an appropriate technique, esthetic results can be achieved with predictable outcomes.

CONCLUSION

Reattachment of a tooth fragment is aviable technique that restores function and esthetics with a very conservative approaching a single visit and can be considered when treating patients with coronal fractures of the anterior teeth, especially in younger patients.

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