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Case Report

A case report of sub-gingival cervical crown fracture reattachment using fiber post- A 22 months follow up

Akshat Waran¹, Samiksha Sharma^{2,*}

¹Dept. of Conservative and Endodontics, Pacific Dental College, Udaipur, Rajasthan, India

²Dept. of Periodontics, Himachal Dental College, Sunder Nagar, Himachal Pradesh, India



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ABSTRACT

A 15-year-old male presented to the Department of Conservative Dentistry and Endodontics immediately after a facial injury having complain of persistent pain in the teeth and the front upper lips. Upon examination it was revealed trauma of the upper incisors, also injury to the marginal gingiva of the front teeth. Further inspections showed slight laceration of the oral mucosa in the lower labial sulcus. Radiographic examination revealed fracture of crown of maxillary central incisor. The treatment plan which was decided comprised of complete removal of fractured crown followed by root canal therapy and immediate post placement and reattachment of the crown.

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1. Introduction

Human body is made up of various structures many bones, muscles and organs and each of them can be injured upto a varying degree but head is slightly more vulnerable than other important parts. The head also includes the face which is bound by scalp superiorly and the lower border of mandible. The most common mechanism by which facial injuries can occur are motor accidents, domestic violence, sports and work related accidents. However, these injuries vary drastically from the geographical area to another.¹ In the developed countries motor accidents account for facial injuries when compared to developing countries. But among various injuries the sports injuries which involves the face accounts for about 11- 40% of the injuries and the most common types of facial injuries / trauma are soft tissue injuries followed by fractures of the nose, zygoma, and mandible, as well as dentoalveolar trauma.²⁻⁴ but any of these can occur in any combination or as independently.

Each of the injuries have different management which depends upon the extent of the injury and more importantly the type.

Many authors have classified the dental injuries in variety of manners, the most common being Ellis classification⁵ and WHO classification. Each of the aforementioned dental traumatic injuries are usually unanticipated events, if these injuries are not managed properly they not only can cause serious sequences but also may affect physiological and psychological well being of the patient.

The present case report describes treatment of an incomplete sub gingival fracture of the crown with 22 months follow up.

2. Case Report

A 15-year old male patient was referred to the department of the Conservative dentistry from the primary health centre. The patient had a fall while playing in his school, the mother and patient first went to the primary health care centre but were referred from there to dental hospital and

* Corresponding author.

E-mail address: samikshasharma1693@gmail.com (S. Sharma).

college Sundernagar. Patient's history revealed that he fell head first, after being pushed by his school mates, there was slight bleeding from the mouth. Clinical examination was done to examine all the hard and soft tissue injuries, which revealed apical migration of the marginal gingiva along with pin point bleeding on mesial aspect of interdental papilla of right central incisor (Figure 1). Electric Pulp testing was done to check for vitality of the teeth from right canine to left canine. Right and left canine responded within usual limits but the right lateral and central incisors did not respond, also there was exaggerated response in the left lateral incisor. Mobility was checked for the respective teeth which on examining unveiled that both the canine had Grade I mobility, Right Lateral and Both Central Incisors showed Grade II mobility. A Radiograph (Acteon SOPIX) of the incisors was taken which revealed complete mesiodistal fracture of the crown just above the CEJ of Right Central Incisor followed by PDL widening along the distal aspect of the roots (Figure 2). Also, there was widening present along the entire root of the left central incisor but no fracture was seen on the crown aspect.

After complete clinical and radiographic examination it was decided that root canal therapy of the right central incisors is recommended along the reattachment of the fracture segment with the help of prefabricated fiber post. For the both canines, lateral incisors and left central incisors it was decided to wait and watch, as well as see for developmental changes if any either clinically or radiographically.

The treatment plan was explained to the patient's mother and proper consent was taken before commencing the treatment. As the patient reported, at the time of the closing of the hospital; ligature wire splinting was done in order to stabilize the coronally fractured segment (Figure 3). On the next day the treatment was undertaken, inferior orbital nerve block along with incisive nerve block was administered, local infiltration too was administered over the mucosa of central incisors. The fractured coronal segment was atraumatically removed (Figure 4) and stored in Hank's Solution and radiograph was taken to confirm the status of remaining tooth structure.

The bleeding was evident and was controlled with cotton pellets soaked in haemostatic agent. To expose the fracture site and for accessing the canal, electrocautery was performed (Figure 5). After sufficient amount of tissue was removed; access was achieved and working length was determined with apex locator (Raypex 6 VDW dental) after establishment of working length, canal was instrumented till number # 25 K- File and then followed by a WaveOne™ Gold Primary file (25/07)(Figure 6). It was made sure that canal preparation be as narrow as possible and obturation was done with Primary WaveOne Gutta Percha using BC sealer to achieve a "monoblock" (Figure 7). This is the concept in which a sealer bonds to

both the core material and the dentinal wall to create a singular unit that enhances sealing and also strengthens the root-filled tooth against fracture.⁶ For the reattachment of the coronal segment a prefabricated fiber post was used in a manner that the part of the post was in the root canal and the coronal part of the post was used for attaching the fractured crown to the remaining tooth structure. Immediate post space was made with help of warm condensers so that a total of 5mm of Gutta Percha was left to maintain the apical seal. The Gutta Percha was properly condensed in a manner, so that no gutta percha was attached to the wall a radiograph was taken to confirm the length of the post space and amount of the gutta percha left in the apical region.(Figure 8) Tenax Fiber Trans post was selected as post of choice as a fiber post it was better it has lower modulus of elasticity which is closer to the dentin.⁷ It also has high fatigue resistance and its translucency gives an excellent option to be used in aesthetic region. The post was tried passively into the canal and the coronal segment was placed in front of the post, the head of the post and the coronal fragment was aligned in such a manner that both coincided. Later, with help of the post then with help of the round bur a slot was made near the base of the coronal fracture segment. The slot in the fracture segment and the post were attached in a manner that both had proper fit.(Figure 9) After checking the fit and margins of the fracture segment with the remaining tooth structure both clinically and radiographically, the fiber post was cemented with the help of dual cure resin, then fractured coronal segment was also cemented.(Figure 10) It was made sure that the fractured segment was in the same plane as its adjacent teeth and light cured.(Figures 11 and 12) Radiograph was taken to confirm the position of the fracture segment. Patient was recalled after 1 month to see the status of the tooth, patient reported with no pain and the radiographs still showed periodontal widening.(Figure 13) Pulp testing was done on the maxillary right canine and maxillary left canine which responded within the usual limits, maxillary right lateral incisors and maxillary left central incisors responded early to pulp testing. Patient again reported to the department after a year and the coronally fractured segment of maxillary right central incisor was still intact (Figures 14, 15 and 16). Pulp testing was done from maxillary right canine to maxillary left canine and each of the teeth responded within the normal limits. Radiograph was taken and it revealed complete healing of the periodontal space of root of maxillary right central incisors, also there was no sign of resorption associated with root of maxillary right central incisor or any other teeth.

3. Discussion

Trauma to the permanent teeth can be devastating and the management can be quite varied depending upon the injury type. Ideally conventional treatment options include Partial



Fig. 1: Pre-Operative

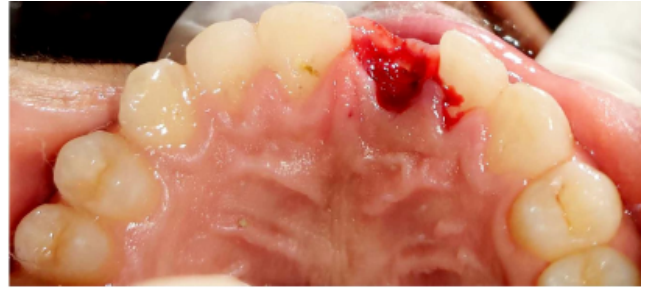


Fig. 4: Coronal segment removed



Fig. 2: Radiograph



Fig. 5: Electro cautery



Fig. 3: Splinting



Fig. 6: Master cone



Fig. 7: Final obturation



Fig. 9: Coronal fracture fit

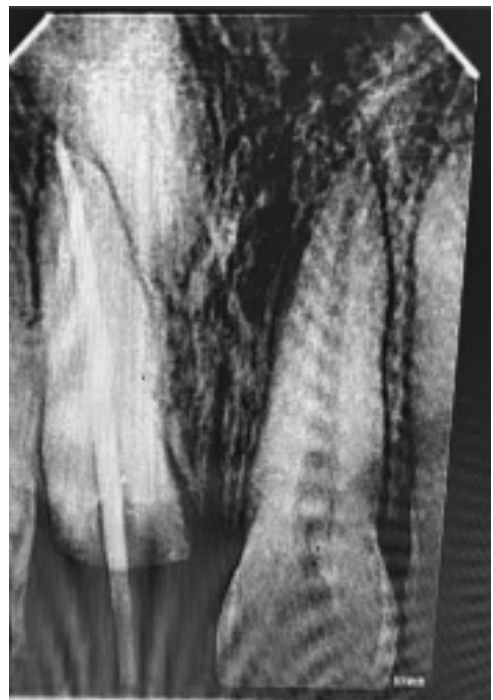


Fig. 8: Fiber post try in



Fig. 10: Fiber post cemented (radiograph)



Fig. 11: Coronal fragment attached



Fig. 12: Coronal fragment (buccal view)



Fig. 13: Coronal fragment (lingual view)



Fig. 14: 1 Year follow up(buccal view)



Fig. 15: 1 Year follow up (lingual view)



Fig. 16: 1 Year follow up (radiograph)

and Full Coverage crown, Composite resin Build up and quite few others. The first reported case was described was by Chosack and Eidelman in 1964⁸ when the same fractured segment is used to attach the remaining tooth structure. The advantage of using the same fragment is that it will help to restore the teeth to either its natural shape, form and more importantly retain the teeth in the proper occlusal alignment.

Dental adhesion has improved tremendously over past decade which is mainly due to improved bond strength. With advent of newer bonding agents as well as the resins, success of the attachment of segment has become more predictable. Also newer bioceramic sealers can achieve a monoblock that bond the dentine wall and gutta percha further providing the strength to the tooth. The main advantage of using the tooth fragment is that it avoids the difficulty of contour and texture reproduction in the prosthesis. Unmatched shades between the crowns of the natural tooth and prosthesis. The long term prognosis of reattached crown is significantly better than composite resin restoration.⁹ Though, studies have demonstrated that use of fiber post does not increase the fracture resistance of the endodontically treated tooth¹⁰ but in this case the objective of the fiber post was retention of the coronal fracture segment rather than to provide increased fracture

resistance. For the attachment of the segment a wide variety of technique are available which ranges from the surgical exposure to orthodontic extrusion to surgical extrusion each of the technique has it pros and cons and also demands a specific scenarios in which each of the them can be used.

4. Conclusion

Trauma to the teeth can be complex and usually require a thorough understanding of the anatomy of the tooth but also other factors. The treatment of such cases requires a multi- disciplinary approach to achieve a predictable and best possible outcome for the patient. Tooth reattachment is fast, inexpensive and more importantly it gives aesthetically predictable outcomes and should be used where ever the need for adaptation of the fracture segment is required.

5. Conflict of Interest

The author declares no potential conflicts of interest with respect to research, authorship, and/or publication of this article.

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Author biography

Akshat Waran, Senior Lecturer

Samiksha Sharma, 3rd Year Post Graduate Student

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