Reattachment of Traumatized Tooth

Dr. John Gurung,[1] Dr. Sandhya Shrestha[2]

[1,2]Department of Conservative and Endodontics, Kantipur Dental College, Basundhara, Kathmandu, Nepal

Correspondence:
Dr. John Gurung. Email: johngrg24@gmail.com

ABSTRACT

Dental trauma is such a situation where the patient is affected both socially and psychologically. Patients with trauma are in pain and need emergency treatment. Such patients are quite apprehensive because of impaired functions, aesthetics, and phonetics. The prime objective while handling such cases is successful pain management with immediate restoration of function, aesthetics, and phonetics. The advances in adhesive dentistry have allowed dentists to use the patient's own fragment to restore the fractured tooth. Reattachment is an ultraconservative technique which provides safe, fast, and aesthetically pleasing results. This paper discusses tooth fragment reattachment technique and presents a clinical case of complicated crown fracture. A 20-year-old male patient was reported to Kantipur Dental College with the chief complaint of fractured lower anterior teeth due to fall injury. Clinical and radiographic examination revealed Ellis Class III fracture in mandibular right lateral incisor and canine resulting in severe pain and loss of aesthetics and function.

Keywords: Crown Fracture; dual cure resin; reattachment.

INTRODUCTION

Traumatic tooth fractures are the common reason for seeking dental care. They are more common in boys than in girls because of their active involvement in extracurricular activities.[1] The most frequent causes of trauma are falls; bicycle, motorcycle, and car accidents; sports activities; collision with other person and objects; and domestic violence fights and physical assault.[2] Coronal fracture is a frequent type of dental trauma in the permanent dentition.[3] Eighty percent of traumatised incisors have fracture line proceeding in an oblique direction from labial to lingual aspect.[4]

Anterior teeth trauma of a young patient is a tragic experience, which requires immediate attention not only because of damage to dentition but also because of the psychological impact it may have on the patient and parents. Various methods and techniques can be employed to restore a fractured teeth which include pin-retained resin, orthodontic bands, stainless steel crowns, porcelain jacket crowns, and complex ceramic restorations.[5] However all these restorations require significant tooth preparation and may not be aesthetically adequate; moreover they may not be always feasible.[6]

The first case report on reattachment of a fractured incisor fragment was published by Chosack and Eidelman in 1964 in which the complicated tooth fracture was managed by endodontic therapy followed by a cast post and core and patient's fractured tooth as a crown.[7] The use of acid etch technique for the reattachment of fractured fragment was first reported by Tennery. Similar cases were also reported by Starkey[8] and Simonsen.[3] The success of reattachment depends on certain factors like the site of fracture, size of fractured remnants, periodontal status, pulpal involvement, maturity of the root formation, biological width invasion, occlusion, time material used for reattachment, use of post, and prognosis.[9] Reattachment is a process to restore the natural shape, contour, translucency, surface texture, occlusal alignment, and colour of the fragment along with a positive emotional and social response from the patient to the preservation of natural tooth structure, and it is also economical and conservative procedure.[3]

Figure 1: Fractured mandibular right canine.

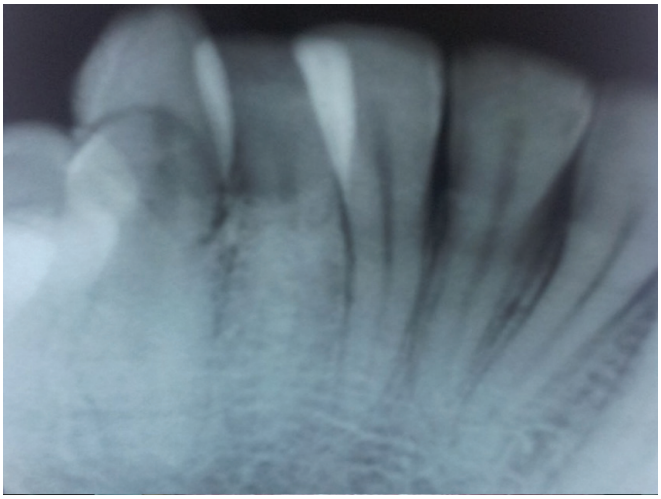

Figure 2: Radiographic view of fractured mandibular right canine.

CASE REPORT

A-20-year-old male patient reported to Kantipur Dental College, with the chief complaint of fractured lower anterior teeth due to fall injury during bike ride. Clinical and radiographic examination revealed Ellis class III fracture in mandibular right lateral incisor and canine resulting in severe pain and loss of aesthetics and function. The patient gave the history of fall injury during bike ride three hours ago. Clinical examination revealed anterior crowding of mandibular teeth with lingually placed mandibular right lateral incisor with horizontal fracture in the cervical third region of the mandibular right lateral incisor and canine involving enamel and dentin with exposure of the pulp and the fractured fragment being loosely attached to the tooth (Figure 1). Soft tissue examination showed laceration of the lower lip.

A periapical radiographic examination revealed an oblique fracture labio-lingually; the root formation was complete with no extrusion of the teeth (Figure 2). The patient expressed the desire to maintain the tooth and restore it, as it is economical compared to an indirect restoration. A detailed explanation about the treatment plan was given to the patient, which included endodontic treatment, and then reattachment of the tooth crown using a metal post and informed consent was taken from the patient.

TREATMENT PROCEDURE

Local anesthesia was administered followed by the removal of the fractured segment completely which was preserved in normal saline solution in order to prevent dehydration and discolouration of the tooth fragment. Following a detailed examination, the fit of the fragment was checked. Working length was established with the help of radiograph with a 15 K file (Figure 3) followed by the biomechanical preparation by hand protaper files by Dentsply, with the master file protaper F4. Irrigants 2.5% sodium hypochlorite and saline solution were used during the preparation alternately. The root canal was dried with paper points and obturated using protaper F4 gutta percha (Dentsply) and zinc oxide eugenol sealer (Figure 4). After completion of the endodontic treatment, the right mandibular lateral incisor was extracted and crown lengthening was done with electrocautery in the right mandibular canine. After two days the root canal was prepared for the post placement by removing the gutta percha from the coronal two-thirds of the canal with peeso reamers (drill size 3). Bevels were placed on the tooth and the fractured fragment, in order to enhance the retention. The metal post (Dentsply) was tried in the canal and adjusted to the desired length. Space was also prepared in the pulp chamber of the fractured crown fragments for receiving the coronal portion of the post and also the core. The alignment of the coronal fragment was verified with the post in situ. The post was then cemented in the canal using GIC luting cement (Figures 5, 6, and 7). The inner portion of the coronal fragment and the root portion was etched with 37% ortho phosphoric acid (Figures 8 and 9), rinsed with water, dried and bonded to the tooth using dual cure auto mixing composite resin (ResiCem by SHOFU) after proper shade matching. The tooth was polished with polishing disc (Figures 10 and 11).

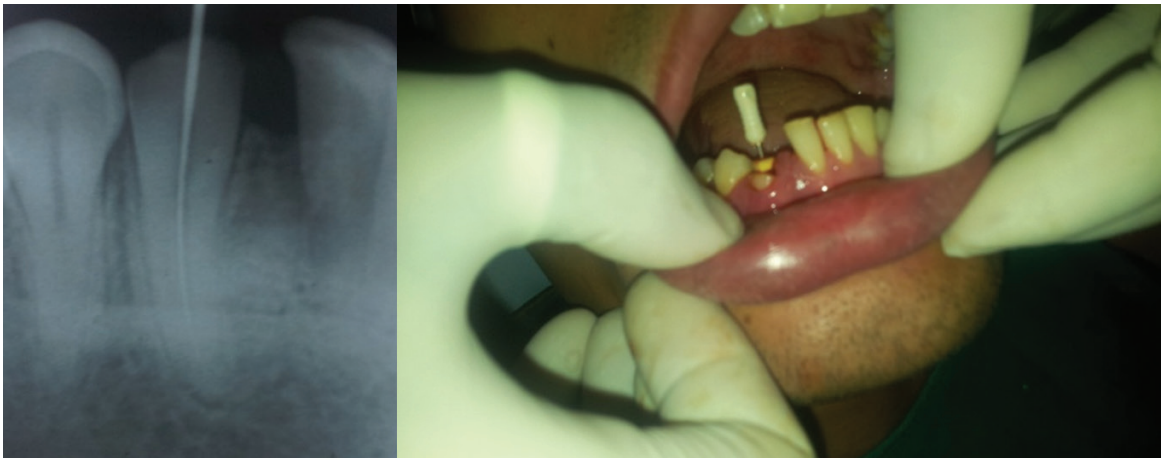

Figure 3: Working length determination with 15K file A) radiographic and B) clinical.

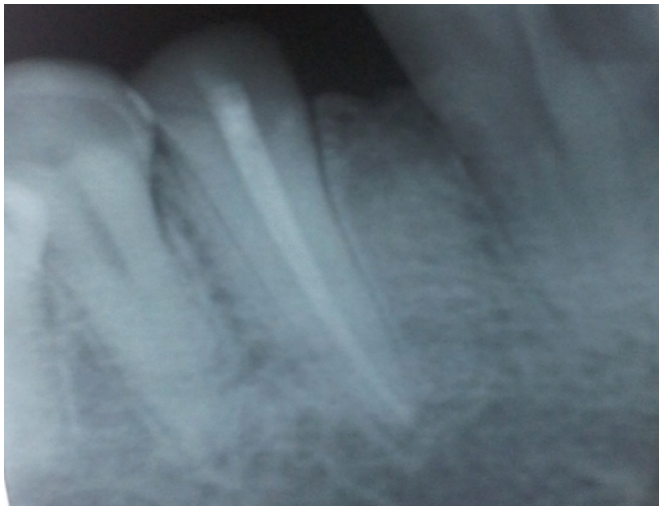

Figure 4: Protaper F4 gutta percha obturation.

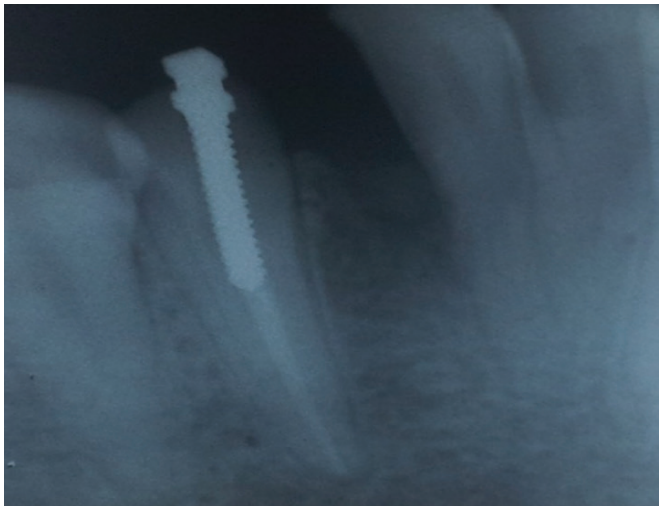

Figure 5: Radiograph of metal post-placement.

Figure 6: Metal post placement clinical view.

Figure 7: Metal post placement clinical view.

Figure 8: Etching of coronal fragment and root portion with 37% ortho phosphoric acid.

Figure 9: Etching of coronal fragment and root portion with 37% ortho phosphoric acid.

Figure 10: Post operative buccal view.

Figure 11: Post operative occlusal view.

DISCUSSION

Whenever the fracture fragment is available reattachment should be the first choice of treatment.[10] In recent years due to remarkable advancements of adhesive systems and resin composites, it is now possible to achieve excellent results with reattachment of tooth fragments provided that the biological factors, materials, and techniques are logically assessed and managed.[11] As with the conventional restoration, restorative success depends on proper case selection, strict adherence to sound principles of periodontal and endodontic therapies, and the techniques and materials for modern adhesive dentistry.[12]

In the present case of complicated crown fracture requiring endodontic therapy, the fractured fragment was available and reattachment of the fragment with metal post is performed. The use of the natural tooth substance offers a conservative, aesthetic, and economical option that provides good and long lasting aesthetics, restores function, results in a positive psychological response, and is certainly a simple procedure.

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. Reattachment failures occur as a result of new trauma or parafunctional habits, so fabrication of a mouth guard and patient education about treatment limitations enhance clinical success.[13]

With all traumatic injuries, follow up is of critical importance and the patient should be followed for 3, 6, and 12 months and yearly for 5 years.[14] At these follow-up visits aesthetics, tooth mobility, and periodontal status should be confirmed both clinically and radiographically.

Because of larger incidence of trauma to dental tissues and to their supporting structures, it is important to have proper knowledge on clinical techniques and their indications, along with risk-benefit ratio. The reattachment of the tooth fragment is possible only when the fragment is available which can be improved with different adhesive techniques and restorative materials. The main concern and challenge is to educate the population to preserve the fractured fragment and seek immediate dental care.

ACKNOWLEDGEMENT

I would like to acknowledge Associate Professor Dr. Rabindra Man Shrestha, Department of Orthodontics and Vice Principal, Kantipur Dental College, Teaching Hospital and Research Centre, Kathmandu for helping me in scientific paper writing.

REFERENCES

1. American Academy on Pediatric Dentistry Council on Clinical Affairs. Guidelines on management of acute dental trauma. Paediatr Dent. 2008-2009;30(7 Suppl):175-83
2. Andreasen J, Andreasen F, Andreasen J. Textbook and color atlas of traumatic injuries to the teeth. Copenhagen: Munksgaard; 1994.
3. Simonsen R. Restoration of a Fractured Central Incisor using Original Tooth Fragment. J Am Dent Assoc. 1982;105(4):646-8.
4. Reis A, Loguercio A, Kraul A, Matson E. Reattachment of fractured teeth: a review of literature regarding techniques and materials. Oper Dent. 2004;29(2):226-33.
5. Buonocore M, Davila J. Restoration of Fractured Anterior Teeth with Ultraviolet-Light-Polymerized Bonding Materials: A New Technique. J Am Dent Assoc. 1973;86(6):1349-54.
6. Goenka P, Marwah N, Dutta S. Biological approach for management of anterior tooth trauma: Triple case report. J Indian Soc Pedod Prev Dent. 2011;29(2):180.
7. Chosack A , Eidelman E. Rehabilitation of a fractured incisor using the patient's natural crown. Case report. J Dent Child. 1964;31:19-21.
8. Starkey P. Reattachment of a fractured fragment to a tooth—a case report. J Indian Dent Assoc. 1979;58(5):37-8.
9. Wadhwani C. A single visit, multidisciplinary approach to the management of traumatic tooth crown fracture. Br Dent J. 2000;188(11):593-8.
10. Yilmaz Y, Zehir C, Eyuboglu O, Belduz N. Evaluation of success in the reattachment of coronal fractures. Dent Traumatology. 2008;24(2):151-8.
11. Vashisth P, Mittal M, Singh A. Immediate reattachment of fractured tooth segment: a biological approach. Indian J Dent Res Rev. 2012:72-4.
12. Andreasen F, Steinhardt U, Bllle M, Munksgaard E. Bonding of enamel-dentin crown fragments after crown fracture. An experimental study using bonding agents. Dent Traumatol. 1993;9(3):111-4.
13. Andreasen F, Noren J , Andreasen J , Engelhardtsen S, Lindh-Stromberg U. Long-term survival of fragment bonding in the treatment of fractured crowns: a multicenter clinical study. Quintessence Int. 1995;26(10):669-81.
14. Rajput A, Ataide I, Fernandes M. Uncomplicated crown fracture, complicated crown-root fracture, and horizontal root fracture simultaneously treated in a patient during emergency visit: a case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;107(2):48-52.