International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 01-04 www.ijdmsrjournal.com ISSN: 2582-6018

Reattachment of complicated and uncomplicated crown fractures: an aesthetic approach

Dr. Sandhya Malik[1], Dr. Ajay Kumar Nagpal[2]
[1]*PG Student, Department of Conservative Dentistry and Endodontics, K.D. Dental College and Hospital, Mathura, Uttar Pradesh*
[2]*Professor and Head of Department, Department of Conservative Dentistry and Endodontics, K.D. Dental College and Hospital, Mathura, Uttar Pradesh*

Submitted: 01-09-2022 Accepted: 10-09-2022

ABSTRACT: One frequent type of dental trauma is front tooth region crown fractures. Reattaching the fractured fragment to the remaining tooth can result in greater function, better aesthetics, a more favourable psychological reaction, and a quicker, simpler operation if the original tooth fragment is kept. This case report presents two cases using two different reattachment procedures to manage complicated and uncomplicated crown fractures. Ellis Class II fracture case of upper right central incisor is described in the first case report. In the second case report, a complicated upper left central incisor fracture is repaired using fiber post cementation and reattachment following nonsurgical endodontic therapy. Reattaching the fractured fragment is a conservative method of treatment that is both affordable and successful.

KEYWORDS: Complicated and uncomplicated crown fracture, dental trauma, reattachment, non-surgical endodontic treatment

I. INTRODUCTION

The treatment of coronal fracture is difficult for dentists because they must meet the requirements of the original tooth, such as form and dimension, opacity, and translucency, in order to achieve a successful restoration.[1] Although composite resin restoration is recommended for fractured anterior teeth, reattachment is a great choice when the fragment is still available. The concept of "fragment reattachment" emerged with the introduction of adhesive dentistry.[2] Chosack and Eidelman[3] proposed the technique of reattaching a tooth fragment for the first time in 1964. Reattachment has the advantage of being a highly conservative approach that does not require any form of preparation, allowing for the preservation of natural tooth structure, acceptable aesthetics, and patient acceptability. The success of fragment reattachment is determined by the fragment's firm attachment to the tooth, as well as strong bonding between the two segments and the tooth preparation.[4]

This paper describes two different cases of anterior teeth fracture. Both of them were successfully treated using natural tooth fragment reattachment.

II. CASE REPORT 1

The first case was presented with uncomplicated Ellis Class II fracture in the permanent maxillary right central incisor. Clinical crown was fractured obliquely without any involvement of the pulp chamber. Fracture line was located supragingivally. The patient presented after 2 days of trauma and had preserved her tooth fragment in water. No signs and symptoms of pulpal and periapical infection were present. Pulp sensibility tests can be nonreliable, and hence, they were recorded only for baseline parameter. To preserve the vitality of pulp, root canal procedure was not performed. To conserve the tooth structure and achieve optimal adaptation of the tooth fragment, tooth was left unprepared. Crown and tooth fragment were etched with 37% phosphoric acid, left for 20 sec, washed and air dried. Later, bonding agent (Single bond universal, 3M, ESPE, St. Paul, MN, USA) was applied on both crown and tooth fragment. After which, fragment was placed in position with flowable composite resin (Filtek fow, 3M, ESPE, St. Paul, MN, USA) in between and light cured for 40sec on both labial and palatal surface. Reattachment was done but fracture line was still visible. To merge it, a groove was made with torpedo diamond bur. Then, etching, bonding agent application was done and then, packable composite resin was placed and light cured for 40sec. After the procedure, occlusion was checked and the patient was given the postoperative instructions. Clinical examinations along with pulp sensibility test were performed at 3 months of follow‐up. Tooth showed similar response to adjacent and contralateral teeth. (Fig. 1)

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 01-04 www.ijdmsrjournal.com ISSN: 2582-6018

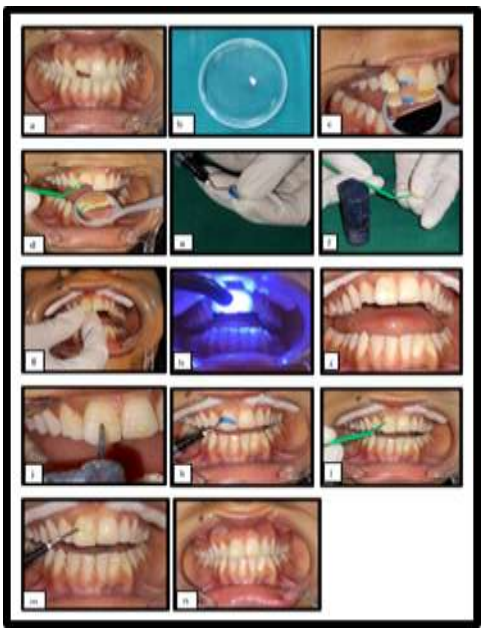

Fig. 1:a) pre operative, **b)** fragment stored in 50% dextrose solution, **c)** etchant application, **d)** bonding agent application, **e)** etchant application on tooth fragment, **f)** bonding agent application on tooth fragment, **g)** fragment placed in position with flowable composite resin in between, **h)** light curing of composite resin, **i)** fragment attached, **j)** groove made on the fracture line with torpedo diamond bur, **k)** etchant application, **l)** bonding agent application, **m)** application of flowable composite resin in groove, **n)** post operative

III. CASE REPORT 2

The second case of reattachment presented with Ellis Class III fracture in the permanent maxillary left central incisor. The fracture line was supragingival with intact fractured fragment. Fracture line was located at the apical third of clinical crown. The patient had reported with the fractured fragment on the day of trauma itself. No signs and symptoms of periapical infection were observed. After obtaining consent from patient, root canal treatment (RCT) was completed using single‐ visit endodontics. (Fig. 2.1) Cleaning and shaping was performed up to an apical size of ISO size 60. 5.25% sodium hypochlorite was used as an irrigant during the preparation. 17% EDTA was used as final rinse. The root canal was dried with paper points and obturated using cold lateral condensation with gutta‐ percha and AH Plus sealer. Post space preparation was done till #3 peeso reamer. Fragment was debrided of any remaining pulp tissue, thoroughly rinsed with sodium hypochlorite, and preserved in saline. The fiber post #3 (Reforpost, Angelus) was tried in the canal and adjusted to the desired length. The prepared post space was etched for 15 seconds using 37% phosphoric acid (DPI Tooth conditioner gel, Dental Products of India, Mumbai, India). It was then rinsed thoroughly with water and excess water was removed with a cotton pellet. Next the adhesive (Prime & Bond NT, Nanotechnology Dental adhesive, Dentsply, St. Paul, MN, USA) was applied on the etched surface as well as the post. The adhesive was air thinned and light-cured for 10 seconds. The post was then luted with self-adhesive resin cement (3M ESPE Rely X U200) with 2mm of its coronal portion extending into the chamber. Tooth fragment was reattached using flowable composite resin cement. Bonding and reattachment protocol was followed similar to the case discussed above. To merge the fracture line, a groove was made and restored with packable composite as mentioned in previous case. (Fig. 2.2) After the procedure, occlusion was checked, the patient was given the postoperative instructions, and postoperative X‐ ray was taken. Clinical examinations were carried out at 3 months of follow‐ up.

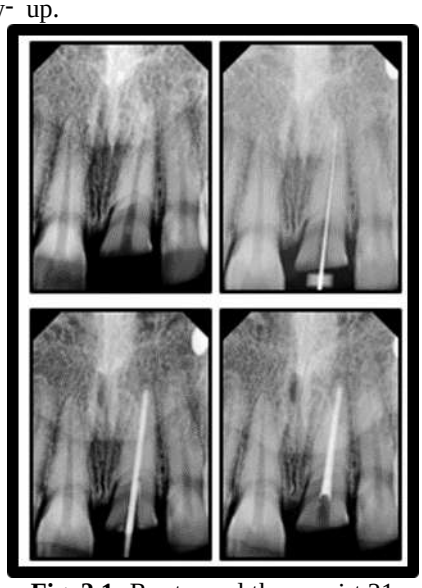

Fig. 2.1: Root canal therapy irt 21

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 01-04 www.ijdmsrjournal.com ISSN: 2582-6018

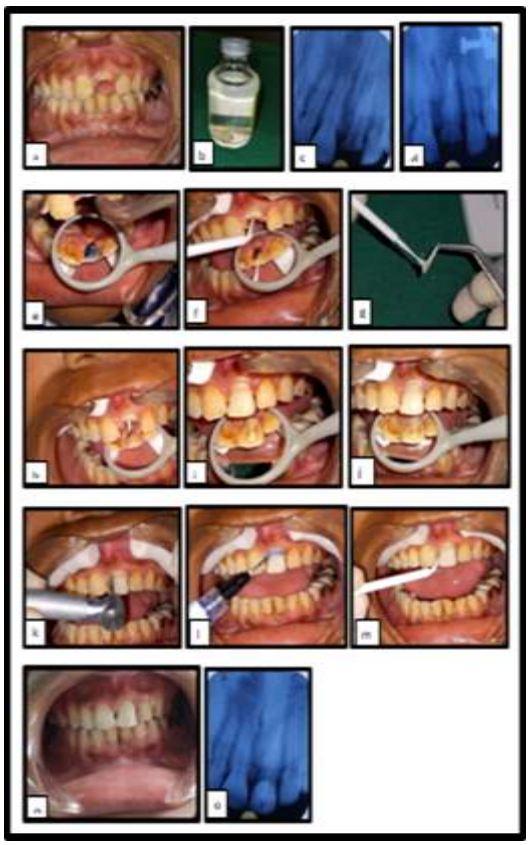

Fig. 2.2: a) pre operative, **b)** fragment stored in normal saline, **c)** post space, **d)** fiber post fit check, **e)** etchant application in post space, **f)** bonding agent application in post space, **g)** dual core resin cement placed on fiber post, **h)** fiber post placed in post space, **i)** hole made through the paatal surface , **j)** fragment attached, **k)** groove made on fracture line, **l)** etchant application, **m)** bonding agent appication, **n &o)** post operative

IV. DISCUSSION

Due to its high prevalence, which ranges from 7.4% to 58 percent, dental trauma is a public health concern.[5] It can start in the first years of life and worsen during early growth, affecting mostly school-aged children (8–11 years).[5] One out of every three children has a primary tooth that has been traumatised, whereas 25% of children and 33% of adults have trauma in their permanent dentition.[6] A single tooth is usually affected by dental trauma. Traumatic experiences such as sports, violence, and traffic accidents, on the other hand, might result in many injuries. The anterior teeth, particularly the upper central and lateral incisors, are frequently implicated, followed by the lower incisors of both dentitions.[7]

When compared to other procedures, tooth fragment reattachment is a more conservative, affordable, and less time‑consuming treatment option with favorable advantages, such as original color match, preservation of contour, contacts, and incisal translucency.[8] The type of treatment depends on pulp vitality and the stage of root development or resorption. In complicated fractures, RCT followed by reattachment of the fractured segment with fiber post reinforcement is a feasible option. In fractures involving two‑thirds or more of the crown, post systems are usually recommended.[9] Out of wide variety of post systems available, tooth-colored fiber post was considered to be the best option with a number of important advantages such as esthetics, good bonding between post and cement, lower chair side time, and minimal tissue removal.[9,10] Wide variety of treatment protocols are available for reattachment procedures. Some techniques of fragment reattachment include a bonding procedure without any type of preparation of the remaining tooth or tooth fragment surfaces. This technique is called simple reattachment. However, some authors prefer tooth preparation in the form of external chamfering, over contouring or internal dentinal groove before bonding to aid in retention.[11]

In this case report, management of both complicated and uncomplicated crown fracture is done by reattachment.

V. CONCLUSION

The 2 cases presented in this paper suggest that, with the materials available today along with appropriate clinical technique, reattachment of tooth fragment is a viable and conservative treatment option for fractured incisors. It is hoped that this report of 2 cases will add to the increasing volume of evidence which supports the viability of reattachment of the broken fragment of the anterior tooth reinforced by suitable restorations. Future reports may need to focus on reporting longer follow up to bolster the evidence in favour of this treatment option.

REFERENCES

[1]. Demarco FF, Fay RM, Pinzon LM, Powers JM. Fracture resistance of reattached coronal fragments—influence of different adhesive materials and bevel preparation. Dent Traumatol. 2004; 20: 157-163.

[2]. Capp CI, Roda MI, Tamaki R, Castanho GM, Camargo MA, de Cara AA. Reattachment of rehydrated dental fragment using two techniques. Dent Traumatol. 2009; 25: 95-99.

[3]. Chosack A, Eidelman E. Rehabilitation of a fractured incisor using the patient's natural

crown: case report. J Dent Child. 1964; 71: 19–21.
[4]. Prabhakar AR, Kurthukoti AJ, Kayalvizhi G. A comparison of impact strength of fragment-bonded anterior teeth using three different restorative materials: an in vitro study. J Indian Soc Pedod Prev Dent. 2007; 25: 88-92.
[5]. Bastone EB, Freer TJ, McNamara JR. Epidemiology of dental trauma: a review of the literature. Aust Dent J. 2000; 45: 2–9.
[6]. Glendor U. Epidemiology of traumatic dental injuries-a 12-year review of the literature. Dent Traumatol. 2008; 24: 603–611.
[7]. Sharmin DD, Thomas E. Evaluation of the effect of storage medium on fragment reattachment. Dent Traumatol. 2013; 29: 99–102.
[8]. Taguchi CM, Bernardon JK, Zimmermann G, Baratieri LN. Tooth fragment reattachment: A case report. Oper Dent 2015;40:227‐34.
[9]. Schwendicke F, Göstemeyer G. Single‐visit or multiple‐visit root canal treatment: Systematic review, meta‐analysis and trial sequential analysis. BMJ Open 2017;7:e013115.
[10]. Trushkowsky RD. Restoration of endodontically treated teeth: Criteria and technique considerations. Quintessence Int 2014;45:557‐67.
[11]. Garcia FC, Poubel DL, Almeida JC, Toledo IP, Poi WR, Guerra EN, et al. Tooth fragment reattachment techniques – A systematic review. Dent Traumatol 2018;34:135‐43.