IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 3 Ser. 10 (March. 2019), PP 87-89
www.iosrjournals.org

Management of Complicated Crown Fracture with Calcium Hydroxide Pulpotomy: A Case Report

Dr.Karthik Jayan[1], Dr.Ancy.A[2], Dr.Shiji Dinakaran[3], Dr.Soumya L.S.[4],Dr.Arsha D.V.[5], Dr. Midhun M.J.[6]

[1,2,3,4,5,6]*Department of Conservative Dentistry and Endodontics, GDC, Thiruvananthapuram, Kerala, India*
Corresponding Author: Dr.Karthik Jayan

Abstract : *Crown fractures account for the majority of dental traumas. Disfigurement of anterior teeth have a physical and emotional impact on the patient. If handled properly, prognosis of the pulp following a traumatic crown fracture can be favorable. Vital pulp therapy (VPT) is the treatment of choice for traumatized or carious teeth with vital pulp exposure.VPT allows continuation of the root formation, which leads to apical closure, stronger root structure, and a greater structural integrity. The present case report focuses on the treatment of a traumatized mature permanent incisor with exposed pulp that was treated with the novel technique of partial pulpotomy using calcium hydroxide.*

One-year follow-up revealed that the tooth was responsive to vitality tests and radiographic assessment showed the presence of a thick dentinal bridge beneath the calcium hydroxide layer.

Date of Submission: 28-02-2019 Date of acceptance: 18-03-2019

I. Introduction

Most common traumatic dental injuries affecting permanent teeth are uncomplicated and complicated crown fractures.[1]A fracture that involves enamel, dentin and pulp is referred to as complicated crown fracture, which has an incidence of 18 - 25 % of all dental injuries. [2] The maxillary incisors are the most commonly affected teeth due to their position in the arch and labial proclination, forming 96% of all crown fractures.[3]The most common etiology of trauma in permanent dentition is fall followed by traffic injuries, acts of violence and contact sports.[4] Most crown fractures occur in young, caries-free anterior teeth which makes maintaining or regaining pulp vitality essential. Treatment of complicated crown fracture in general involves vital pulp therapy such as direct and indirect pulp capping as well as partial and full pulpotomy. The long term prognosis of traumatized teeth depends on appropriate emergency management.[5]

Pulp capping is recommended for small exposure that occurred not more than a few hours previously. With extended time and increase in the size of exposure, partial pulpotomy or complete pulpotomy would be considered as the treatment of choice. *Partial pulpotomy* (Shallow pulpotomy or Cvek pulpotomy) implies the removal of a small portion of the vital coronal pulp as a means of preserving the remaining coronal and radicular pulp tissues.[6]

A clinical management using Cvek technique with calcium hydroxide and a follow-up report of a complicated crown fracture is discussed in this case report.

II. Case Report

A 25 year old male patient reported to the Department of Conservative dentistry and Endodontics, GDC Thiruvananthapuram with the chief complaint of broken upper front teeth following trauma from an automobile accident one day ago. He had a sharp pain with short duration during eating and drinking. The medical history was noncontributory. No soft tissue injury was noticed on extra oral examination. Intraoral examination revealed a complicated enamel‑dentin crown fracture of tooth #11 and #21.The mobility and probing depth were within normal limits and positively responded to vitality tests. The remaining maxillary and mandibular anterior teeth were intact and showed normal response to cold test (Endo-Frost cold spray – ColteneWhaledent, Langenau, Germany) and electric pulp testing (Parkell Farming date). Periapical radiographic examination revealed an intact laminadura, periodontal ligament space, mature root apices with no root fractures in relation to #11 and #21. [Figure 1]

Preventive endodontics with "partial pulpotomy," using calcium hydroxide in a single visit was planned for #11 and #21.

The procedure was explained to the patient and consent was obtained. The teeth were isolated using rubber dam under local anesthesia (2% lignocaine with epinephrine 1:100,000, Pharma Health Care Product, Mumbai)[Figure 2]. The teeth surfaces were cleaned with saline and the enamel margins were beveled. The

exposed surface of the pulp was gently touched with a sterile round diamond bur in presence of copious water-cooling; the total removal of the pulp did not exceed 3mm. The cavity was disinfected, and the bleeding was controlled by cotton pellet soaked with 5.25% sodium hypochlorite for 2–4 min [Figure 3a].

Calcium hydroxide powder (Deepti Dental Products, Raigarh) and saline were mixed and was gently condensed into the pulpal cavity with a thickness of approximately 2mm.[Figure 3b]. Calcium hydroxide was covered with light curing glass ionomer (Vitrabond 3M ESPE Dental Products, Canada). The remaining tooth structure was etched with 37% phosphoric acid (3M ESPE, St. Paul, MN, USA) for 15 s. The etched solution was rinsed with air/water spray and dried. The bonding agent (Single bond 3M ESPE) was applied and cured for 10 s, and restored with composite resin(3M ESPE, St. Paul, MN, USA). The margins were light cured for 40 s and then polished using diamond stones and a composite polishing kit (Shofu Dental Corporation, Kyoto, Japan) [Figure 3c].

The teeth were asymptomatic at recall visits at 1, 3, 6 months and 1 year. The one-year follow-up radiograph shows formation of a thick dentinal bridge beneath the biomaterial as well as normal contour and width of PDL [Figure 4]. The teeth responded normally to cold test and EPT.

Figure 1: Pre-Operative Radiograph. **Figure 2:** Exposed surface of the pulp. **Figure 3a:** Cavity after removal of the exposed pulp. **Figure 3b:** Placement of Calcium hydroxide paste. **Figure 3c:** Coronal restoration with composite. **Figure 4:** 1 year follow up radiograph

III. Discussion

The principal objective of the treatment in traumatic injuries of anterior teeth is the rehabilitation of both esthetics and function. As mentioned by Andreasen and Andreasen, a frontal impact, the energy of which exceeds the shear strength of enamel and dentine leads to crown fracture. The fracture line direction depends on the direction of impact but is usually horizontal and follows direction of enamel rods.[1] In addition, most crown fractures occur in young, caries-free anterior teeth which make maintaining or regaining pulp vitality essential. Treatment of complicated crown fracture in general involves the desire for maintaining a vital pulp.[7]

The primary goal of vital pulp therapy is to maintain pulp vitality, generating dentinal bridge formation and apical closure.[8]It has also been shown that under optimal conditions, vital pulp therapy (rather than removal) can be carried out successfully on a mature tooth. Mechanical exposure of the pulp due to trauma has a better prognosis than carious exposure. According to Cvek, the complicated crown fracture produces superficial inflammatory changes and a proliferative response extending not more than 2 mm into the pulp, where removal of 1–2 mm of the exposed pulp and application of compatible dressing is usually enough.[6] Hence every attempt must be maintained to minimize bacterial contamination of the exposure. Pulp capping is recommended for small exposure that occurred not more than a few hours previously. With extended time and increase in the size of exposure, partial pulpotomy or complete pulpotomy would be considered as the treatment of choice.[9]

The advantages of partial pulpotomy, as compared with cervical pulpotomy, are in the preservation of cell-rich coronal pulp tissue, a necessary element for better healing, and in the physiologic apposition of dentin in the coronal area.[2]

The choice of a pulp capping material has a pivotal role in the success of vital pulp therapy in traumatized teeth with exposed pulps, providing a tight seal by the material will prevent further bacterial contamination. Calcium hydroxide (CH) has been the material of choice in pulpotomy for many decades because of its ability to repair tissue. Desirable characteristics of CH include an initial high alkaline pH, which is responsible for stimulating fibroblasts and enzyme systems. In addition, it neutralizes the low pH of acids,

shows antibacterial properties, and promotes pulp tissue defense mechanisms and repair.[10] Calcium hydroxide clearly has many favorable characteristics as a vital pulp therapy agent.

IV. Conclusion

Advances in our knowledge of pulpal physiology and immunology have markedly changed the treatment approaches for teeth involved with pulps. Pulpal preservation has become the norm rather than its removal. In this case, partial pulpotomy with calcium hydroxide proved successful in promoting the healing of pulpal tissue. Long-term prognosis of Cvek's partial pulpotomy technique suggests a viable treatment option in management of complicated crown fracture in mature teeth.

Acknowledgment

This article would not have been contemplated without the important academic and clinical contribution and support of staffs of Department of Conservative dentistry and Endodontics, GDC Trivandrum.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

[1]. Andreasen J. Etiology and pathogenesis of traumatic dental injuries. Scand Dent Journal/European J Oral Sci. 1970;78:329–42.
[2]. De Blanco LP. Treatment of crown fractures with pulp exposure. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1996;82(5):564–8.
[3]. P Goenka, N Marwah SD. Biological approach for management of anterior tooth trauma: Triple case report. J Indian Soc Pedod Prev Dent. 2010;28(3):223–9.
[4]. C. M. Forsberg and G. Tedestam. "Etiological and predispos- ing factors related to traumatic injuries to permanent teeth,." Swed Dent J. 17(5):183–190.
[5]. Martinez-Marquez B, Ojeda-Gutierrez F, Pozos-Guillen A, Arteaga-Larios S, Ruiz-Rodriguez MS. Management and Followup of Complicated Crown Fractures in Young Patients Treated with Partial Pulpotomy. Case Rep Dent. 2013;2013:1–5.
[6]. Cveck M. A clinical report on partial pulpotomy and capping with calcium hydroxide in permanent incisors with complicated crown fracture. J Endod. 1978;(4):232–7.
[7]. Al-Zubaidi SH. Management of coronal fracture of traumatized central incisor: Report of two cases. Saudi Endod J. 2017;7(1):40.
[8]. Nosrat A, Asgary S. Apexogenesis Treatment with a New Endodontic Cement: A Case Report. J Endod [Internet]. 2010;36(5):912–4. Available from: http://dx.doi.org/10.1016/j.joen.2009.11.025
[9]. Asgary S, Fazlyab M. Management of complicated crown fracture with miniature pulpotomy: A case report. Iran Endod J. 2014;9(3):233–4.
[10]. Mohammadi Z, Dummer PMH. Properties and applications of calcium hydroxide in endodontics and dental traumatology. Int Endod J. 2011;44(8):697–730.

Dr.Karthik Jayan. "Management of Complicated Crown Fracture with Calcium Hydroxide Pulpotomy: A Case Report." OSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 3, 2019, pp 57-59.