ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at:www.ijdsir.com
Volume – 8, Issue – 1, February – 2025, Page No. : 199 - 203

Holistic Management of Complicated Anterior Maxillary Crown Fracture- A Clinical Case Report

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Citation of this Article: Dr. Amanat Dhillon, Dr. Vinay Bal Singh Thakur, Dr. Vasundhara Pathania, Dr. Neha, "Holistic Management of Complicated Anterior Maxillary Crown Fracture- A Clinical Case Report", IJDSIR- February – 2025, Volume – 8, Issue – 1, P. No. 199 – 203.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

This article aims to report a successful treatment of a complicated crown fracture in a 14 year old boy. An Ellis Class VIII fracture involves the complete loss of the crown and it's subsequent replacement. To reduce the psychological trauma associated with extraction, a fibre post and core buildup were performed, followed by the placement of a Porcelain fused to metal crown after endodontic treatment of the tooth diagnosed with a crown en masse fracture.

Keywords: Trauma, Fracture, Fibre Post, Porcelain Fused To Metal Crowns.

Introduction

The vast majority of Traumatic Dental Injuries (TDI) occur in children and teenagers where loss of a tooth has lifetime consequences.[1] Traumatic Dental Injuries are the most overlooked oral conditions regardless of their high prevalence rate and associated impact on children.[2] Coronal fractures of maxillary anterior teeth are most commonly encountered (37%) due to their anatomical position and an increased tendency to get hit during any traumatic event due to the protrusive eruptive pattern.[3] The incidence of complicated crown fractures varies between 2% and 13% of all the dental injuries.[4] Dental

traumatic injuries occur mostly at 1–3 years in primary dentition and 8–11 years in permanent dentition.[5]

Ellis Class VIII tooth fracture is the loss of crown en-masse and its replacement involving a fracture of the crown below the gingival attachment which violates its biological width, resulting in chronic pain and inflammation of the gingival tissue and an unpredictable loss of alveolar bone.[6] Tooth fracture below the gingival attachment or crest of the alveolar bone makes it difficult to restore. Therefore, an adequate amount of tooth structure must be present above the attached gingiva. Crown lengthening procedures such as, electrosurgery of the gingival margin or periodontal surgery with removal of bone can be performed in alignment with the required esthetic outcomes.[7]

Tooth with more than 50% tooth structure loss requires root canal treatment followed by post and core and a porcelain fused to metal coverage so as to provide the lost strength of the tooth.[8] Root canal treated tooth has a decreased occlusal load carrying capacity therefore the need for post is essential to prevent the fracture of remaining tooth structure.[9]

In the wake of changing treatment concepts, the treatment options should aim to save the traumatized tooth as well as the psychological well-being of the patient.

This article reports a case endodontically treated with Fibre Reinforced Post and Core for the restoration of traumatically fractured maxillary right permanent central incisor followed by Porcelain fused to metal crown.

Case Report

A 14 year old male patient accompanied by his father reported to the Department of Pediatric and Preventive Dentistry, Himachal Dental College, Sundernagar, Himachal Pradesh, with the chief complaint of broken tooth in upper right front region. Detailed history revealed that patient had fallen while playing during school hours. On clinical examination, right maxillary central incisor was found to be fractured. The tooth fragment was removed and kept in saline so as to maintain it's viability. Since the tooth fragment was intact the initial treatment planned was the natural tooth fragment reattachment.

Single visit root canal treatment was done under sterile conditions, local anesthesia was injected in the maxillary central region. Access was established and working length was taken with respect to 11 and pulp was extirpated using manual hand filing. The biomechanical preparation was done using solution of 3% Sodium hypochlorite along with saline and 17% EDTA. After cleaning and shaping of the canal, the canal was dried using paper points and gutta percha obturation was done. After a week, as the tooth margins were covered with the gingival tissue so prior to the post placement, crown lengthening procedure was performed using BP blade number 15 to remove the gingival tissue to see the tooth margins and obtain the ferrule effect. Later after another week, post space was created using peeso reamers leaving 4-5 mm of gutta percha at the apical third of the tooth and fibre reinforced post was placed after trimming it to the adequate length as they decrease the chances of tooth fracture and provides strength, dual core resin was used to cement the post and core build up and the fragment was reattached using composite material.

Due to esthetical reasons, the patient's parents agreed for a more sustainable restoration and hence crown preparation was done, impression was made and Porcelain fused to metal crown was given with respect to maxillary right central incisor. The patient is still under follow up.

Figure 1 A: Preoperative Clinical Photograph

Figure 1 B: Preoperative Clinical Maxillary Intraoral Photograph

Figure 1 C: Preoperative Periradicular Radiograph

Figure 1D: Tooth Fragment after Removal

Figure 2 A: Preoperative Periradicular Radiograph

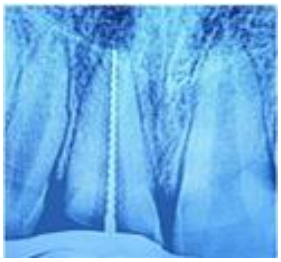

Figure 2 B: Working Length Radiograph

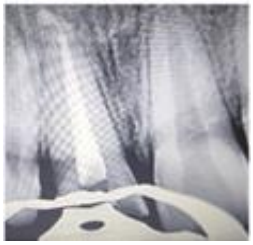

Figure 2 C: Obturation

Figure 2 D: Post Placement Radiograph

Figure 2 E: Reattachment of Tooth Fragment Radiograph

Figure 3 A: Postoperative Fragment Reattachment

Figure 2 B: Crown Preparation

Figure 2 C: Porcelain Fused To Metal Crown Placement

Discussion

Complicated crown fractures of teeth account for 18% to 20% of all dentofacial injuries. Adeyemo et al reported that traumatic dental injuries and their effect on the quality of life have a prevalence of 20.2% and a peak age of 8-12 years.[10] Young patients are more prone to maxillary anterior teeth fracture (Andreasen 1981).

Goldson et al 1981 believed that it is better to restore fractured teeth rather than extract them. Restoration of endodontically treated teeth has always been an area of concern and the recent years have seen a surge of interest in addressing functional and esthetic challenges in this field.

Various treatment methods for the treatment of fractured anterior teeth includes crown lengthening with osteotomy and gingivectomy, orthodontic extrusion, and surgical extrusion. Crown lengthening with osteotomy and gingivectomy can lead to uneven gingival heights between adjacent teeth, potentially affecting esthetics. Additionally, it results in loss of supporting bone and variations in clinical crown length (Smidt et al 2005).[11]

Orthodontic extrusion can be performed by a stiff arch wire with elastic thread, stainless steel ligature on a light arch wire or a flexible arch wire with 20–30 g of force which is the optimum force required for extrusion (Bulem et al 2008). Bone remodeling at the end of orthodontic extrusion causes new bone formation which occurs at about 4–5 weeks after orthodontic extrusion (Andreasen et al 1994). Fiberotomy of the supracrestal periodontal fibers was carried out to prevent relapse due to the stretching of the marginal and apical periodontal fibers. Sometimes, remodeling continues for about 3–5 months after the completion of orthodontic treatment (Reitan 1969).[11]

Conventionally, cast posts have been used for a long time to restore fractures involving pulp. With modern adhesive dentistry, resin-based fiber-reinforced posts have been used in the restoration of maxillary anterior teeth. Fiber resin posts show similar hardness to dentin and exhibit greater durability than the metal posts with modulus of elasticity being similar to dentin, it strengthens the remaining tooth structure and increases resistance to tooth fracture. Because of the added advantages, fiber post was used in this case to restore the fractured tooth with composite resins.[2,8]

Roshan Uthappa, Deepika Mod et al conducted a study to compare fiber post and metal post in the endodontically treated teeth restorations and concluded that less chances of failure were seen with fiber post retained restored teeth than that of the metal post. Endodontically treated teeth restored with fiber dowel-composite core and all-porcelain crowns had a higher survival rate (96%) after 24 months of observation. As noted by some authors, chances of root fractures with fibre post retained restorations were less in comparison to that of metallic posts.[12]

Conclusion

This case report highlights the significance of multidisciplinary comprehensive management of a complicated crown fracture followed by permanent restoration, while maintaining the emotional, esthetic, phonetic and functional demands of the patient.

References

1. Bourguignon C, Cohenca N, Lauridsen E, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental

injuries: 1. Fractures and luxations. Dent Traumatol 2020;36(4):314-330.

2. De Paiva HN, Paiva PC, De Paula Silva CJ, Lamounier JA, Ferreira EFE, Ferreira RC. Is there an association between traumatic dental injury and social capital, binge drinking and socioeconomic indicators among schoolchildren? PLOS One.
3. Kang Y, Franco CS. A story of dental injury and orthodontics. Oral Health Dent Manag 2014;13:243-53.
4. Geeta IB, Preethi S. Managment of complex crown root fracture using f ibre post – A case report. Endodontology 2014;26:211-6.
5. Babaji P. Analysis of traumatic dental injuries in children – A rerospective study. J Adv Med Dent Sci Res 2017;5:94-6.
6. Koyuturk AE, Malkoc S. Orthodontic extrusion of subgingival fractured incisor before restoration. A case report: 3 years folowup. Dent Traumatol 2005;21:174-8.
7. Delivanis P, Delivanis H, Kuftinec MM. Endodontic-orthodontic management of fractured anterior teeth. J Am Dent Assoc 1978;97:483-5.
8. Thakur VS, Pathania V, Anuradha, Sudan T, Negi D, Mishra P. Esthetic Rehabilitation of Ellis Class VIII Fracture in 14- Year old Patient – A Clinical Case Report (IOSR-JDMS) e-ISSN 2279-0853, p-ISSN:2279-0861. Volume 18 Issue 11 November 2019.
9. Gbadebo OS, Ajayi DM, Oyekunle OO, Shaba PO. Randomized clinical study comparing metallic and glass fiber post in restoration of endodontically treated teeth. Indian J Dent Res 2014;25:58-63.
10. Ahworegba TO, Chukwumah NM, Ugorji CV, Orenuga OO. Management of complicated crown fracture with an aberrantly placed tooth fragment- a case report and review of the literature. J Paediatr Dent Res Pract 2024;5(1):1-7.
11. Ami S, Moshik LT, Eyal V. Orthodontic extrusion of an extensively broken down anterior tooth: A clinical report. Quintessence international (Berlin, Germany: 1985); 2005;36:89-95.
12. Uthappa R, Mod D, Kharod P, Pavitra S, Ganiger K, Kharod H. Comparative evaluation of the metal post and fiber post in the restoration of the endodontically treated teeth. J Dent Res Rev 2015;2:73-7.