OPEN ACCESS

Haya: The Saudi Journal of Life Sciences
Abbreviated Key Title: Haya Saudi J Life Sci
ISSN 2415-623X (Print) | ISSN 2415-6221 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Case Report

Multidisciplinary Treatment Approach for Complicated Crown-Root Fracture w.r.t 11

Dr. Shalu Majreti[1*], Dr. Nitin Khanduri[2], Dr. Avantika Tuli[3], Dr. Mridul[4]

[1]PG Student, Department of Pediatric & Preventive Dentistry, Seema Dental College & Hospital, Virbhadra Rd, PO Pashulok, Aam Bag, IDPL Colony, Rishikesh, Uttarakhand 249203, India
[2]Reader, Department of Pediatric & Preventive Dentistry, Seema Dental College & Hospital, Virbhadra Rd, PO Pashulok, Aam Bag, IDPL Colony, Rishikesh, Uttarakhand 249203, India
[3]Professor & Head, Department of Pediatric & Preventive Dentistry, Seema Dental College & Hospital, Virbhadra Rd, PO Pashulok, Aam Bag, IDPL Colony, Rishikesh, Uttarakhand 249203, India
[4]PG Student, Department of Pediatric & Preventive Dentistry, Seema Dental College & Hospital, Virbhadra Rd, PO Pashulok, Aam Bag, IDPL Colony, Rishikesh, Uttarakhand 249203, India

DOI: 10.36348/sjls.2022.v07i12.004 | **Received:** 11.11.2022 | **Accepted:** 17.12.2022 | **Published:** 23.12.2022

***Corresponding author:** Dr. Shalu Majreti
PG Student, Department of Pediatric & Preventive Dentistry, Seema Dental College & Hospital, Virbhadra Rd, PO Pashulok, Aam Bag, IDPL Colony, Rishikesh, Uttarakhand 249203, India

Abstract

Dental trauma causing crown-root fracture is among utmost challenging types of dental traumas in terms of management, which often involves maxillary permanent incisors prior to completion of their root development and can result in tooth loss The goal of this case was to give a clinical example of rehabilitation of a complex crown-root fracture of the right maxillary central incisor that was treated successfully using a multidisciplinary approach that also included surgical crown lengthening. In the follow-ups, the final result was aesthetically pleasing and periodontally sound.

Keywords: Complicated Crown-root fracture, Surgical crown lengthening, Custom- made metal post and core.

INTRODUCTION

A crown-root fracture is a form of dental trauma which occurs when the fracture line begins in the tooth's crown and extends apically through into root in an oblique orientation. These fractures are classified as complicated or uncomplicated according to either pulp is involved or not. Crown-root fractures have been linked to around 5% of all dental injuries [1]. Those fractures, which occur beneath the gingival edge, involved enamel, dentin, and cementum they are classifed as complicated or uncomplicated fractures site on the existence or absent of pulpal involvement. The biologic width is commonly encountered in a crown-root fracture. The total diameters of epithelial and connective tissue attachments to the tooth is referred to as biologic width [2]. Before restoring the crown-root fracture, at least 2 - 3 mm of sound root structures slightly above alveolar bone are necessary to offer long-term periodontal and functional stability, fulfilling both biologic width and 1 to 2 mm gingival crevice. Gingivectomy, apically positioned flap surgery, and osseous surgery all have been advocated for clinical crown lengthening, but each has both functional and aesthetic drawbacks. Surgical crown lengthening is the most prevalent approach [3].

This case report describe a multidisciplinary management of a complicated crown-root fracture using root canal treatment, re-establishing biological width by surgery crown lengthening and custom made metal post and core final restoration using acrlyic crown.

CASE REPORT

A 10 years old patient reported to our department of Pediatric and Preventive Dentistry with a chief complaint of broken right upper front teeth since, 1 week. He had an accidental hit against a pillar during cycling. There was no loss of consciousness and no vomiting and epistaxis the trauma was followed by oral bleeding and pain.

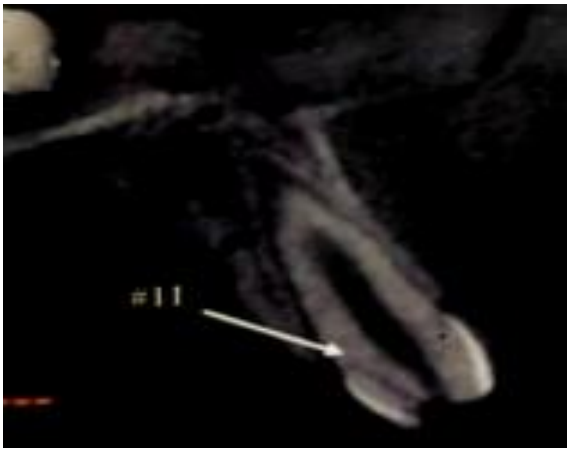
Intraoral examination revealed a complicated crown-root fracture of the maxillary right central incisors (Figure 1). The tooth was tender on percussion

with no associated mobility. The Cone Beam Computed Tomography revealed a Linear hypodent line is evident on palatal aspect of 11 involving cingulam extending distal to mesial aspect of cingulam (Figure 2). Fracture fragment is evident in palatal aspect of 11. Periodontal ligament widening at root apex and entire palatal aspect of the root of 11. Keeping the patient's fragile age in mind, we designed a treatment strategy that was minimally invasive, economically effective, and visually pleasing. The treatment strategy, including its complications, all explained to the patient and his parents. After taking consent topical anesthesia was applied at the site of injection and local anesthesia was administered then fracture fragment was removed and pulp extirpation was done and working length was taken and biomechanical preparation was done teeth were filled with Ca(OH)2 dressing and after 1 week copious irrigation was done with 2.5% NaOCl then canal was dried with paper point and obturated with gutta percha by using the lateral condensation technique, which was then followed by temporary restoration (Figure 3).

To increase the clinical crown height surgical crown lengthening planned to establish the desired gingival marginal position then patient advised all routine blood examination and all reports are in normal range. So, we proceed towards crown lengthening procedure. After giving adequate anesthesia probing depth measured 2 mm from distal aspect and 4mm from palatal aspect. Pocket marker is used to mark the bleeding point then external bevel incision was given in continuous motion in buccal and palatal side using a no. 15 blade. Kirkland knife was used in continuous motion to remove gingiva from buccal and palatal aspect (Figure 4). Then after bleeding is arrested periodontal co-pack was placed and patient kept on antibiotic and analgesic for 3 days. Then patient recalled after 1 week the surgical side was completely healed then we proceed with post space preparation so, for that Peeso reamer was used to remove gutta percha. To preserve a good seal, 2/3 of the gutta percha was removed from the canal with a Peeso reamer, leaving 5mm of gutta percha at the apical end of the root canal. To evaluate the post space preparation, an intraoral digitised periapical radiograph was acquired.

Resin pattern along with tooth pick was used for fabrication of post and core. The resin template was then transferred to the laboratory casting for conversion into a metal post and core. Initially, the fit of the cast post and core was assessed before being luted with type 1 glass ionomer cement (Figure 5, 6). In fracture 11, the remaining tooth structure was prepared with a labial shoulder finish line and a palatal chamfer then Heavy body (putty substance) and light body rubber base impressions were taken (3M ESPE Soft putty). The cast was made of dental stone and temporary acrylic crown was made and luted with type 1 glass ionomer cement (Figure 7). The patient reported no discomfort at 4 month follow-up and happy with treatment.

Figure 1: Intraoral view showing fractured maxillary right central incisor



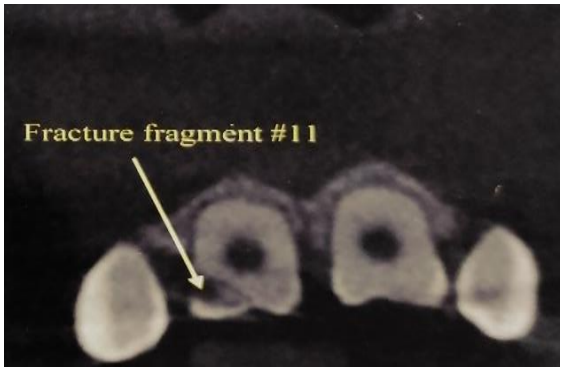


Figure 2: CBCT shows extent of fracture line

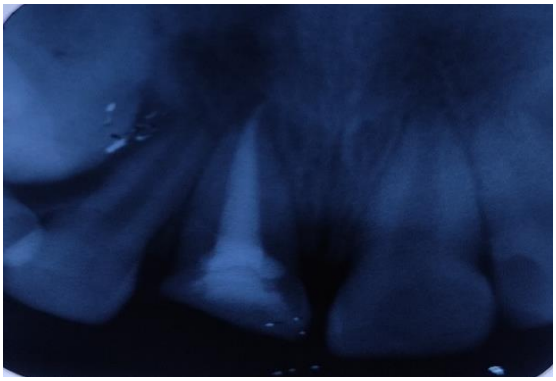


Figure 3: Intra oral periapical radiograph after root canal filling

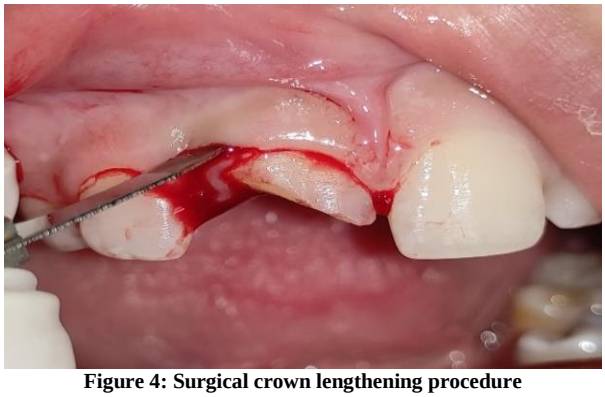


Figure 4: Surgical crown lengthening procedure

Figure 5: Custom made metal Post and core placed irt 11

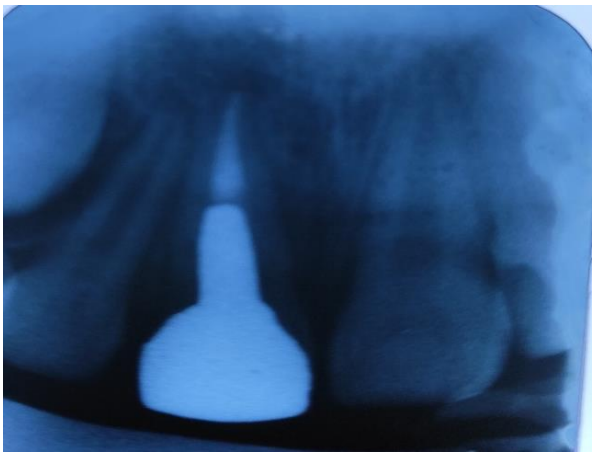


Figure 6: Radiograph showing after metal post and core place irt 11

Figure 7: Post operative view irt 11

DISCUSSION

Dental injuries typically result in severe problems for patients in terms of pain, function, aesthetics, and psychological well-being. The intensity of the trauma, location, and elasticity of the object, the absorption level of the lips and other soft tissues, and the quantity and quality of the tooth and jaw structures are the primary parameters that influence the injury level following dentoalveolar trauma [4]. According to reports, CBCT is a useful tool for diagnosing root fractures. With CBCT, the occurrence of artefacts decreases. Artefacts may be caused by materials such as gutta-percha, canal infill paste, and posts. However, while diagnosing a root fracture, clinical and radiologic signs and symptoms must be considered together [5].

Both aesthetic and mechanical considerations should be considered while rehabilitating traumatised anterior teeth. The treatment of complex crown-root fractures remains difficult. This is owing to the difficulties of achieving isolation with a rubber barrier for a dry operating field, which could lead to failure. For crown-root fractures, various treatment approaches have been offered, including as coronal fragment removal with subsequent repair above gingival level [1]. If possible, preservation of alveolar bone should be prioritised in cases of shattered anterior teeth. In these type of cases, the fractured dental borders are difficult to access until the roots were exposed, either through surgical crown lengthening or orthodontic extrusion [6].

Post-core preparations are typically used in teeth with extensive crown destruction. Restoration serves three functions: support, replacement, and retention. Teeth with extensive crown loss and root-canal therapy may experience retention issues [7].

If optimal outcomes are to be obtained in areas of the mouth where aesthetics are crucial, wound-healing after crown-lengthening surgery must be allowed to complete. Any interruption in the wound-healing process can have negative implications. The periodontium continues to remodel and mature following crown lengthening surgery. According to Bragger and colleagues, gingival recession can develop between 6 weeks and 6 months after surgery. As a result, if prosthetic reconstructions are in the works, recessions must be continuously monitored during the healing process. Temporary crowns should be worn until the wounds have healed completely (this could take up to 6 months), at which point definitive crown preparation and placement can take place. Gingival recession also shouldn't develop if these criteria are followed [8].

CONCLUSION

Trauma to children's permanent anterior teeth creates a psychological stress. In cases of severe root-crown fractures, proper occlusion relation influences

treatment success and prognosis... Cases with complicated root-crown fractures must be followed on a regular basis. If a complication arises, an early diagnosis and treatment can be carried out.

REFERENCES

1. Andreasen, J. O., Andreasen, F. M., & Andersson, L. (2007). In: Textbook and Color Atlas of Traumatic Injuries to the Teeth. 4th ed. Copenhagen Denmark: Blackwell-Munksgaard Publishers.
2. Kulkarni, V. K., Sharma, D. S., Banda, N. R., Solanki, M., Khandelwal, V., & Airen, P. (2013). Clinical management of a complicated crown-root fracture using autogenous tooth fragment: A biological restorative approach. *Contemporary clinical dentistry*, *4*(1), 84-87.
3. Zhen, M., Wang, C., Hu, W. J., Zhang, H., Li, L. S., Wei, Y. P., & Chung, K. H. (2017). Periodontal evaluation of crown-root fractured teeth following modified crown lengthening surgery. *British Dental Journal*, *222*(1), 21-25.
4. Ozel, E., & Altundal, H. (2006). Dentoalveolar and Perioral Soft Tissue Injuries. *Ataturk Univ Dis Hek Fak Derg*, 1, 7-13.
5. Bernardes, R. A., de Moraes, I. G., Duarte, M. A. H., Azevedo, B. C., de Azevedo, J. R., & Bramante, C. M. (2009). Use of cone-beam volumetric tomography in the diagnosis of root fractures. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, *108*(2), 270-277.
6. Prabhu, S. K., Chand, C. V., Joseph, V. S., & John, M. K. (2018). Management of Complicated Crown-root Fracture. *Conservative Dentistry and Endodontic Journal*, *1*(1), 9-13.
7. Peroz, I., Blankenstein, F., Lange, K. P., & Naumann, M. (2005). Restoring endodontically treated teeth with posts and cores--a review. *Quintessence international*, *36*(9), 737-746.
8. Lai, J. Y., Silvestri, L., & Girard, B. (2001). Anterior esthetic crown-lengthening surgery: a case report. *Journal-Canadian Dental Association*, *67*(10), 600-603.