

## Management of Vertical Crown Fracture with Post and Core:A Case Report

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### Abstract

The crown fracture can be complicated, as well as there management. Hence proper diagnosis is necessary for planning its treatment. In the following, case the vertical fracture was diagnosed during the treatment, when access opening was done. Initial diagnosis is very important, in cases of fracture, clinical and radiographical examination are correlated. In this case report the fractured fragment extend till cement-enamel junction, which was removed, followed by root canal treatment and post and core.

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### Introduction

Crown fracture is the most common type of dental injury after trauma to permanent teeth. Coronal fractures may be vertical or horizontal. Vertical root fracture is the fracture involving enamel dentin and cementum exposing the pulp. Vertical fractures may be complete and incomplete based on the separation of fragments and also classified relative to the position of alveolar crest as intraosseous and supraosseous. Vertical crown fracture with pulpal involvement usually involves pain. Pain is mainly due to the mobility of the fractured segment during function. In case of irreversible pulpal changes endodontic therapy is warranted. Identifying the vertical root fractures is often an endodontic

challenge. Diagnosis of vertical fractures includes history, clinical examination, radiographic examination, which reveals J-shaped lesion and halo-like bone loss. Staining, tracing the sinus, periodontal probing, and surgical exploration are also helpful in diagnosis. Clinical findings should be carefully observed and correlated with radiographic findings to obtain correct diagnosis. There are several factors that influence the management of coronal tooth fractures. They are the extent of fracture, pattern of fracture, secondary trauma injuries, presence/absence of fractured tooth fragment and its condition for use, occlusion, esthetics, finances, and prognosis. A number of techniques have been developed to restore the

fractured crown, which ranges from simple composite resin restoration to jacket crown with acrylic resin or porcelain.

Coronal tooth fracture increases cuspal flexure under occlusal load and weakens the

tooth. This decreases the stiffness of the tooth. Hence, a temporary restoration should protect a tooth from further deterioration during endodontic treatment.



Figure 1: Pre -operative radiograph



Figure 2: Pre operative radiograph showing periapical radiolucency

A 38 year old male patient came with chief complaint of pain in lower back right tooth region since 1 week ,clinically there was no evidence of caries in the coronal area .On radiographical examination ,periapical radiolucency (figure 2) was seen.

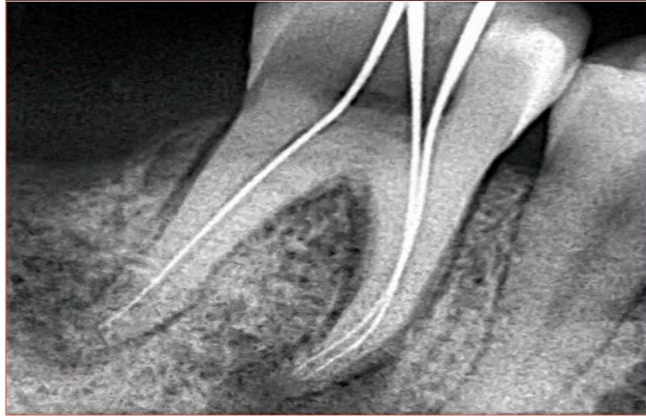
Treatment plan of root canal therapy followed by crown was advised.

Endodontic therapy was initiated with the access opening of 46 ,however during the access opening , a vertical fracture was seen in the coronal portion ,which was not noticed prior to the initiation of root canal treatment.

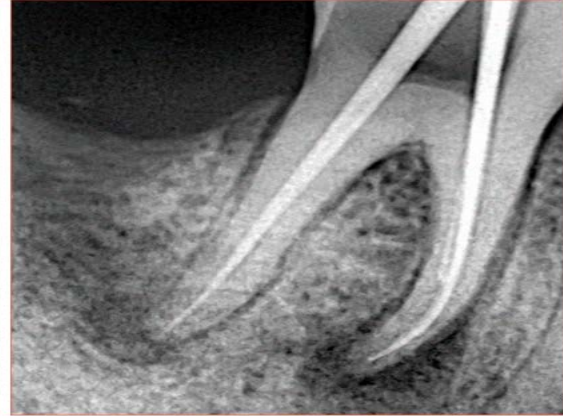
The fracture extended below ,till the roof of pulp chamber .Now , because of the vertical

fracture the changes were made in treatment plan .the broken fragment were removed by the help of forcep.

After removal of the broken fragment (figure-5) ,the access cavity was refined ,the orifice were located and enlarged with orifice shaper. Working length was determined with help of apex locator and radiographically and three canals were located - distal, mesiobuccal and mesiolingual (figure 3).BMP was done by protaper gold (dentsply) followed by copious irrigation by 3% sodium hypochlorite and 17%EDTA . After this temporary material was placed and patient was recalled after 3 days.



**Figure 3: Working length**



**Figure 4: Master cone**

Unfortunately the patient did not visit on the given appointment and came after 1 month due to personal reasons.

Patient reported with dislodged temporary restoration and gingival proliferation over the floor the crown region, but the patient was completely asymptomatic and the pain has subsided.

Now, it was decided to remove the proliferated gingiva, by electrocautery, the patient was given local anesthesia in the required region and the proliferated tissue was removed. The floor was exposed and biomechanical preparation was done again, followed by irrigation.

Now, master cones were placed, tug back was confirmed and the rvg was taken to confirm the proper fit and working length. After, which the obturation was done with calcium-hydroxide based sealer (apex seal).

After obturation it was decided to provide post and core to patient as tooth structure was compromised, the distal canal was prepared for the fibre post.

Post space was created by the help of peeso reamer #2 and 3. Length of the post space was 12mm and the entire working length was 20mm. The fibre post was placed and the fit was checked with help of an xray. The canal was irrigated and dried. and a thin, uniform coat of bonding resin cement (prevest) was applied over the post and thinned further with a slight air stream. The post was carefully seated into the canal using light pressure. The marginal seat was reaffirmed. The post was light-cured in place for 1 min on all surfaces. Core build-up was done with the help of composite resin.



**Figure 5: Broken fragment and clinical view**



Figure 6: Obturation Figure, 7: Placement of fibre post after creating post space, Figure 8: Fibre post placed

### Conclusion

The management of the crown fracture depends upon the line of fracture and the amount of the remaining tooth structure. For a complicated fracture, root canal treatment is indicated and the pulp space is used for reinforcement. If the fractured segment is missing, the management depends upon the available tooth structure. When there is sufficient coronal structure, composite can be bonded to the crown. When crown structure is not sufficient, post and core can be used to retain the remaining structure. Proper instructions should be given after the treatment since even a minor impact can again fracture the crown.

### References

1. Wadhvani C. Restorative dentistry: a single visit, multidisciplinary approach to the management of traumatic tooth crown fracture. *Br Dent J* 2000;2013: 593–8
2. Andersson L. Epidemiology of traumatic dental injuries. *J Endod.* 2013. March;39(3 Suppl):S2–5.
3. Diangelis AJ, Andreasen JO, Ebeleseder KA, Kenny DJ, Trope M, Sigurdsson A, et al. Guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Pediatr Dent.* 2017. September;39(6):401–11.
4. Andreasen JO, Andreasen FM, Andersson L. *Textbook and color atlas of traumatic injuries to the teeth.* Oxford, UK, Ames, Iowa, Blackwell Munksgaard, 2007:684–90.
5. Yuan LT, Duan DM, Tan L, Wang XJ, Wu LA. Treatment for a complicated crown-root fracture with intentional replantation: a case report with a 3.5-year follow up. *Dent Traumatol.* 2013. December;29(6):474–8.
6. Aggarwal V, Logani A, Shah N. Complicated crown fractures—management and treatment options. *Int Endod J.* 2009. August;42(8):740–53.
7. Bajaj P, Chordiya R, Rudagi K, Patil N. Multidisciplinary approach to the management of complicated crown-root fracture: a case report. *J Int Oral Health* 2015. April;7(4):88–91.
8. Roeters J, Bressers JP. The combination of a surgical and adhesive restorative approach to treat a deep crown-root fracture: A case report. *Quintessence Int.* 2002. March;33(3): 174–9.
9. Olsburgh S, Jacoby T, Krejci I. Crown fractures in the permanent dentition: pulpal and restorative considerations. *Dent Traumatol* 2002; 103-115.

10. Terry D A. Adhesive reattachment of a tooth fragment: the biological restoration. *Pract Proced Aesthet Dent* 2003; 403-409.
  11. Sapna C, Renjith Kumar M, Rakesh R, Rajan P R. Uncomplicated crown fracture: A biological management option. *Int J Applied Dent Sci* 2014; 1: 15-17. Available at: <http://www.oraljournal.com/vol1issue1/pdf/23.1.pdf> (accessed August 2019).
  12. Pusman E, Cehreli Z C, Altay N, Unver B, Saracbasi O, Ozgun G. Fracture resistance of tooth fragment reattachment: effects if different preparation techniques and adhesive materials. *Dent Traumatol* 2010; 26: 9-15.
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