# Management of complicated crown fracture with fiber post & lithium disilicate crowns

**Nilesh S Kadam**

Indian Academy of Aesthetic & Cosmetic Dentistry

## Keywords

Ceramic crowns, Fiber post, Ellis class III fracture

## Abstract

Traumatic tooth injuries are common in children & young adolescents. When permanent teeth are involved, it can be a challenge to save these teeth. This case describes rehabilitation of fractured maxillary lateral incisor & canine. Single visit endodontic treatment was done along with the placement of a fiber post and all ceramic crowns in subsequent stage. The patient esthetics was restored back to normal in less duration.

Introduction:

22 year old patient reported to the dental clinic with the chief complaint of fractured front teeth in upper jaw (pic-1a). Patient had a vehicular trauma 4 days prior to his visit. There was no relevant medical history & there were no other serious associated injuries. Clinical examination revealed that maxillary right lateral incisor & canine were fractured at the middle third with the pulpal exposure. Intraoral periapical (IOPA) X ray showed pulpal involvement of the tooth (pic 1b). Patients smile & esthetics was altered because of the trauma to the dentition. (pic 2a & 2b) There was also enamel fracture without any symptoms. Lateral incisor & canine were quiet sensitive to air & on percussion. Patient did not collect the tooth fractured segment at the time of accident. Patient was more concerned about same and wanted to get immediate treatment.

Patient was diagnosed with complicated Ellis Class III fracture with 12 & 13 & uncomplicated ellis class I fracture with 11

(1a) (1b)

Pic- 1a preoperative intraoral view showing Ellis Class III fracture of lateral incisors & canine

Pic- 1b Preoperative intraoral view showing Ellis Class III fracture of lateral incisor & canine

Treatment plan:

After discussing all the possible treatment options with patient a written consent was taken

- Following Treatment plan was proposed
- Root canal treatment 12, 13
- Fiber Post & core 12,13
- Metal free Ceramic Crown 12,13
- Composite restoration of 11

**Treatment:**

***First appointment***

After profound anesthesia, Root canal opening was done from incisal approach. Pulpal tissue was removed with the help of H- file. Working length was determined using Root ZX Apex locator using No. 15k file. The length of the canals then verified with the IOPA (pic 5a). After reconfirming the length the canals were prepared using ProTaper files till F2 .apical gauging was done till 30 no. size with 30 no. K file. Canals were again prepared using circumferential filling till apex. In-between each files 5% Sodium hypochlorite was used as an irrigant. Irrigation was done using 27 gauage needle 2 mm short of the apex.

Master cone x ray was taken (pic 5b) Manual Dynamic Agitation (MDA) was done using GP in which last 2 mm was cut from apex. MDA makes sure it breaks Vapour lock effect & irrigants reach apical third of the canals where the action of irrigants is crucial. A final rinse of 17% Liquid EDTA Dent- Wash (Prime Dent) was carried out to remove smear layer for 1 min. Canals were then flushed with saline to remove all the remnants of Sodium Hypochlorite & EDTA as it affects the outcome.

Canals were then dried using paper points (30/0.06) it was kept for 1 min to soak all the moisture. AH- Plus (Denstply ) was mixed according to manufacturer's instructions and then placed inside the canal using same Gutta percha. Obturation was done using continuous wave compaction. GP was then compacted using Buchanan Plugger 1 properly. It was compacted 5 mm short of apex to make a space for Fiber post. (pic 5c)

Canal was again prepared using Peeso-reamer till size 3 using slow speed handpiece at the minimal speed. Glassix Fiber post was used for this case. Fiber post fit then checked. Fiber post was cleaned using 37% phosphoric acid & bond was applied and it was cured. Canal space & tooth structure were etched with 37% phosphoric acid & washed after 15 seconds followed by application of bonding agent. Luxa-Core (DMG) dual cure resin cement was used to cement fiber post inside the prepared canal space.

Then the core portion was built up with the same material and then it was cured and then teeth were prepared for E-max ceramic crown. 2 mm margins all over were prepared for sufficient ceramic. Retraction cord was placed and margins were modified with End cutting burs (6b). And then Impression was taken using Addition Silicone Putty & light body (pic 6c)

(5a) (5b) (5c)

**Pic- 5a** working length determination, 5b master cone fit, 5c downpack Obturation

(6a) (6b)

**Pic- 6a** – Post placement

**Pic- 6b** Crown preparation for E max ceramic

(6c) (6d)

**Pic- 6c** – addition silicone impression

**Pic- 6d** –Composite temporaries

(6e)

**Pic- 6e** Final cementation

Impression was checked for the proper record and then it was sent to the laboratory for fabrication of lithium disilicate crowns. Shade was selected in the sunlight. 3D Vita shade guide was used here. Direct composite temporary was given to the patient with spot etch technique. Direct Composite buildup of 11 was also done at this time. (pic 6d) Patients esthetics was restored in the first appointment itself, It made patient very happy. (fig 6e)

***2nd appointment***

Temporary composite was removed and re-verified for the complete removal of composite. Bisque trial was taken and necessary changes were done in the crowns. Lab coordination was very crucial in the procedure. Temporary crowns were cemented.

***3rd appointment***

After proper polishing & glazing of the porcelain crowns were cemented using Dual cure resin cement Calibra (Dentsply)

**Bonding Protocol**

1. Ceramic surface -

9 % HF acid was used to etch interior surface of the Crown along with margins for 15 seconds It was then washed with water to remove all remainder. Silane was applied in 2 coats

2. Tooth structure

37 % phosphoric acid was used for 10 seconds. It was then washed with water. Then bond was applied and thinned out using with the air to reduce the thickness of the bonding agent which otherwise reduce the strength of the bond.

Cementation protocol

Dual cure resin cement supplied in base & catalyst paste was mixed on mixing pad with the help of spatula supplied with the kit. The cement was then placed in the crown and then crowns were placed on the tooth and checked for flash to confirm the sufficient resin cement. Tack cure of 4-5 sec was done around margins then the excess cement was removed with the help of explorer from buccal & palatal side. Floss was taken to remove excess cement in the proximal region which otherwise might impinge gingival and cause inflammation.It was then cured for 40-50 seconds.

Postoperative instruction to the patient was given & asked to come for regular follow-up. (pic 9a & 9b )

(9a)

(9b)

Patient was very happy with the final outcome of the procedure & currently under maintenance phase.

## Conclusion

Use of fiber post & metal free ceramic crown can be a simple and efficient procedure for the treatment of anterior traumatized teeth with excellent aesthetic and functional results. The treatment described in the case report is simple and effective and helps to accomplish patient's aesthetic and functional requirement.

## References

1. American Academy of Pediatric Dentistry Council on Clinical Affairs, "Guidelines on management of acute dental trauma," Pediatric Dentistry, vol. 30, no. 7, supplement, pp. 175–183, 2009. McCabe JF. Anderson's applied dental materials, 7th ed., Oxford: Blackwell Scientific; 1990, p. 73.
2. Glendor U. On dental trauma in children and adolescents. Incidence, risk, treatment, time and costs. Swed Dent J Suppl 2000; 140:1–52
3. Cormier CJ, Burns DR, Moon P. *In vitro* comparison of the fracture resistance and failure mode of fiber, ceramic and conventional post systems at various stages of restoration. J Prosthodont 2001; 10(1):26–36