Case Report

Management of crown-root fracture of an incisor using a prefabricated metal post

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ABSTRACT

This case report presents the management and follow-up of a 12-year old boy who had sustained trauma to his upper anterior teeth. The tooth 21 had an oblique fracture just above the cemento-enamel junction running from buccal to the palatal aspect of the root extending upto mid radicular area. Such fractures pose difficulty to treat them because of loosening of fractured coronal fragment. Clinicians have used various techniques to repair such fractures. In this case the coronal fracture was temporarily stabilized using orthodontic wire. Wires are used for immobilizing mandibular fractures and splinting loosened teeth. Their use for repair of fractured teeth has been described here as it is a simple procedure and wires are quite freely available in the dental clinics. This reporting will add to the already available options for saving and restoring teeth sustaining traumatic injuries.

The wire was tightened circumferentially around the tooth at the cervical region. After thorough debridement and copious irrigation canal was filled. A prefabricated gold plated post was loaded with glass ionomer cement and inserted into the canal approximating the fragments close together. Subsequent to successful endodontic therapy, metal-ceramic crowns were provided as final restorations to the teeth. Clinical and radiographic examinations after 12 months revealed a perfect repair of the broken fragments with healthy peridontium.

KEY WORDS: Dental trauma, Fractured teeth, Prefabricated metal post, Crown-root fracture.

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INTRODUCTION

Traumatic injuries to teeth are frequent occurrence and usually involve the children's anterior teeth.[1] The injuries include fractures of root and crown.[2] Repair of fractured tooth fragment is preferred over otherwise, confirmed extraction of the tooth.[3] The advantages of repair include; obtaining healthy periodontal attachment, maintaining the original tooth, involving a more conservative procedure, consuming less time and cost-effectiveness. Pulpal necrosis is a common sequel of fractured teeth and if microbial infection occurs, this will result in the development of a periapical lesion.[4] To avoid this, root canal treatment is performed to eliminate these bacteria as completely as possible.[5] Performing root canal treatment in such cases becomes difficult and requires accurate clinical judgment and fine skills.[6]

Fig-1: Traumatized teeth # 11, 21, 22.

The present case report describes the management of an obliquely fractured tooth having a loosened fragment extending below subgingival area.

CASE REPORT

A 12-year-old boy was referred to the O.P.D at Baqai Dental College Hospital, Karachi, Pakistan with the complaint of discoloration and tenderness of front upper teeth # 11, 21 and 22. The patient's history revealed that he had a bicycle accident three months ago. There was mild pain in the maxillary anterior region but no swelling. His medical history was non-contributory.

Extra orally, there was no scar, swelling and bruising. Tempro-mandibular functioning was normal and the lymph nodes were not palpable. Intra-oral examination of soft tissues showed no signs of scarring or fistulae. The teeth 11, 21 and 22 were discolored and slightly tender to percussion and palpation (Fig-1). An oblique crown-root fracture in tooth 21 involved the cemento-enamel junction and extended from buccal to the palatal aspect to mid radicular area. The coronal fractured fragment had grade II mobility.

All the involved teeth failed to respond to electric pulp testing (DY 310, Dentjoy Dental Co.ltd, Changsha, China) whereas the adjacent teeth responded within normal limits. Periapical radiographs showed an oblique fracture line in mid radicular part of the root extending from cementum; more than 4 mm sub-gingival with large radiolucent lesion having well defined margins around the apex of the tooth 21 (Fig-2).

Teeth 11 and 22 were conventionally root treated and filled. To provide necessary stability to loosened

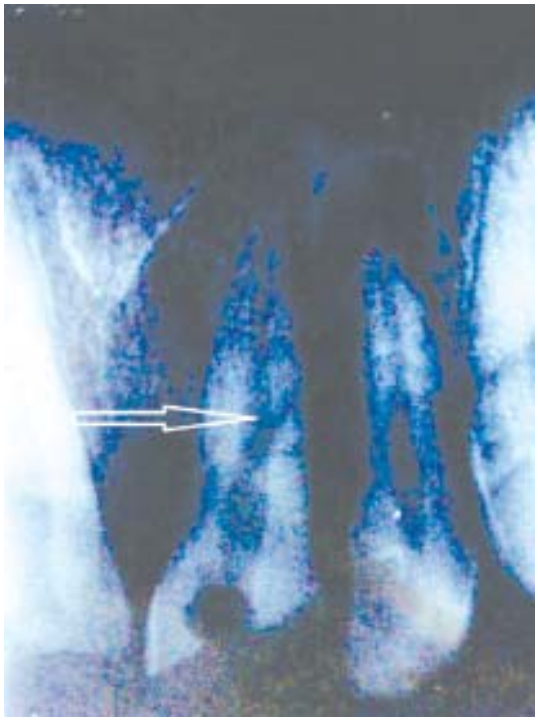

Fig-2: Arrow show mid radicular fracture.

fragment for successful accomplishment of root treatment of tooth 21, splinting was performed with co-axial 0.02 mm thick wire (Dentsply), around the cervical part of the tooth at the level of bone crest

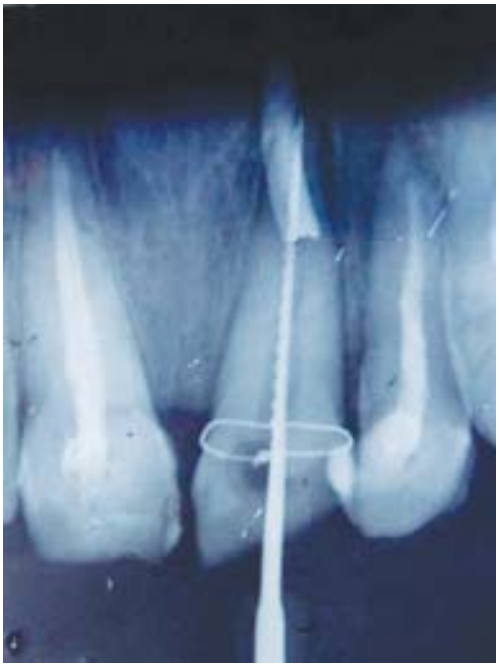

Fig-3: Splinting of tooth # 21 with co-axial wiring.

Fig-4: Approximation of the broken part with endopost.

(Fig-3). Root canal treatment was then initiated. Following access cavity preparation, necrotic pulp tissue was removed and the working length estimated. The canal was prepared with size 25–40 K-files using a step-back technique. Canal was irrigated copiously with 1.25% sodium hypochlorite. Calcium hydroxide powder mixed with sterile distilled–water was inserted into the canal with lantulospiral and the tooth was kept in observation for ten days.

The tooth became symptomless and was root–filled with gutta percha and resin sealer employing lateral condensation technique. Gutta percha was removed with Gates drill #3 to create space for a post leaving 4mm of gutta percha in the apical part of the root. The canal was rinsed and dried carefully and the working area was isolated from moisture by sterile cotton plugs.

A prefabricated dental post (Dentatus Screw, Gold Plated, Nordin SA, CH 1816, Chilly) was inserted into the root canal to the appropriate depth. Prior to cementation, the post walls were smeared with a mix of Glass- ionomer cement. The post was engaged only in the immovable fragment of the fractured tooth while the remaining coronal area was relying on the luting of Glass ionomer cement (GI restorative cement, GC Corporation ,Tokyo). The insertion of the post brought the two fragments in close approximation and helped to firmly immobilize the splinted fragment[7] (Fig-4). Excess resin cement was removed.

Fig-5: Final outcome of the procedure

The restorative procedure was completed by building up the tooth incrementally with a direct resin composite restoration of an appropriate shade (Spectrum, Dentsply Germany). The occlusion was carefully adjusted to avoid any premature contacts or traumatic occlusal forces to the restored tooth. The composite resin restoration was polished with a composite polishing kit (Topex composite polishing paste, Sultan healthcare, Germany)

Finally, after three weeks, the treated tooth was reassessed radiographically and no pathological changes were observed. The splinting wire was removed and restored with porcelain fused to metal crown (Fig-5). The tooth was prepared with 2.0 mm

Fig-6: Six months radiographic assessment

shoulder preparation to accommodate the thickness of metal-porcelain and to avoid fracture of the preparation. The technician was instructed to make well fitting margins to give ferrule effect to the preparation. The crown was inserted and check for premature contact and occlusal adjustment. It was finally luted using GIC (GC Corporation, Tokyo).

The patient was recalled at 3, 6 and 12 months interval for clinical evaluation of the restored tooth. During the recall appointments stability of the crown and radiographic findings were evaluated and found acceptable. The patient had no complaints about the restoration and the associated dentoalveolar complex (Fig-6).

DISCUSSION

The treatment of complicated crown-root fractures in many cases is compromised by tooth fractures that are well below the gingival margin or bone. In this case, the oblique fracture divided the tooth into two fragments. One fragment was immovable and naturally standing into its socket through periodontal apparatus. The other fragment attached to clinical crown was very mobile causing problems during instrumentation and irrigation of the canal to perform root treatment of the tooth. Wiring at the cervical area of the tooth provided sufficient rigidity to the mobile fragment to successfully accomplish the root canal therapy.

Root canal therapy in such type of traumatized teeth is mandatory. Otherwise, saving the teeth with complicated fractures is impossible as the pulp undergoes necrosis. The purpose of the root canal treatment in such cases is to make the canal absolutely bacteria free.

The bacteria free canal and immobilization of mobile fragment via splinting with circumferential wiring and prefabricated canal post, allowed the fracture to heal as a normal orthopedic fracture heals.[8]

CONCLUSION

Merely, extraction is not the only remedy for broken, malposed or decayed teeth. Acid etch technique and other newer materials have changed the total concept of restoring teeth. Operative dentistry offers many viable treatment options for such clinical situations.

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Authors Contribution:

MKS, performed the clinical procedure.
AJM, manuscript writing.
SZA, assisted in the procedure and performed post operative follow up.