Case Report

Intentional replantation with 180° rotation of a complicated crown-root fracture: A Case Report

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ABSTRACT

Complicated crown root fractures are mostly difficult to treat and have a poor prognosis. To restore the biological space, intentional replantation may be chosen when other immediate treatment options are not viable. Intentional replantation with tooth rotation consists of extraction, 180° rotation and replantation, thereby maintaining the biological width. This article presents management of a maxillary central incisor with complicated crown root fracture with open apex. The tooth was rotated and splinted for one week. The apex was closed with mineral trioxide aggregate (MTA) followed by obturation and post placement. The incompletely obturated adjacent tooth was non-surgically managed by retreatment. Finally, glass fibre post followed by crown with indirect composite built up was made. Patient was followed up every three months for the next two years without any complications.

Introduction

Crown root fractures are categorized as those fractures which involve enamel, dentin, cementum. Fractures can be complicated or uncomplicated based on the pulpal involvement. Of all injuries affecting permanent dentition, about 5% are crown root fractures. The most common etiological fracture being direct trauma to anterior region [1]. The management of these fractures depends on the extent of fracture and stage of root development. The treatment of a pulpal injury of immature teeth creates technical difficulties for endodontic treatment, as it is required to induce a calcified barrier in an open apex. The management of patients with complicated crown root fracture and open apex poses a challenge as undergoing apexifications treatment that have high crown-root fracture risks because of the thin dentinal walls and because of the patient’s esthetic needs [2].

Various treatment options for management of complicated crown root fracture includes orthodontic extrusion, surgical crown lengthening and surgical extrusion of apical fragment. The factors depending on the choice of treatment are type of severity of fracture, extent of fracture line, time and cost. Of all the above-mentioned approaches to manage crown root fracture, an unconventional approach is intra alveolar transplantation with 180-degree rotation [3]. This article presents the management of complicated crown root fracture with open apex by intra alveolar transplantation with 180-degree rotation approach.

Case report

A 10-year-old boy was reported to AIMST dental center with a history of dental trauma to his upper front tooth a day before due to...
fall while playing football in school. He complained of severe throbbing and continuous pain of the traumatized tooth. Initial examination revealed swelling and laceration of the upper lip. No clicking or deviation of the temporomandibular joint was noted. Patient was not having any medical abnormality.

Intra oral examination revealed mixed dentition with moderate oral hygiene. Patient has a Class II division I malocclusion with deep overbite and 8 mm overjet. Examination of anterior area revealed multiple oblique fracture lines on 21 (permanent maxillary left central incisor) and fracture line extending 3 mm subgingivally on the palatal aspect. The fractured segment was mobile and was held by the epithelial attachment [Fig. 1a & b]. Tooth 11 (permanent maxillary right central incisor) was also fractured in the middle third with evidence of restorative material. Intra oral radiograph revealed oblique lines of the tooth 21 with immature apex. Tooth 11 showed radiopaque material in the root canal suggestive of obturating material. (Intra oral periapical radiograph IOPA & cone beam computerized tomography CBCT) The obturating material was found to be extruding 2 mm beyond the apex and there was also radiolucency in the periapical region [Fig. 2a & b]. A diagnosis of complicated crown root fracture was arrived for tooth 21 and tooth 11 was diagnosed as previously treated.

Various treatment options were explained to the parents and consent was obtained prior to treatment. Local anesthesia (2% lignocaine, Septodont) was administered and the loosened tooth fragments were removed, and the extent of fracture was inspected. Tooth 21 was luxated with aid of forceps and was rotated 180° clockwise with minimal damage to periodontal ligament and immediately replanted and repositioned with the fracture line exposed supragingivally. Tooth splinting (Fibre splint multilayer MC-Polydentia) was done [Fig. 3]. Immediately access opening was done supporting the tooth and pulp extirpation was completed to avoid inflammatory root resorption. The fibre splint was removed after two weeks once there so no signs of inflammation. In the same visit gutta percha was removed from 11 and biomechanical preparation were done with hand files on 11 and 21. Working length was determined using radiographic method and estimated to be about 19 mm on both 11 and 21. The canals were filled with non-setting calcium hydroxide paste up to the prepared canal length using lentilo-spiral. The canal orifice was sealed with cotton pledget and zincoxide eugenol (Kalzinol) and patient was reviewed after 2 weeks. Apexification was completed with 5 mm of MTA (Proroot, Dentsply) on 11 and 21. [Fig. 4] A glass fibre post (FibreKleer, Pentron) was placed one week later on tooth 11 and 21 to reinforce the tooth structure. The fibre post was cemented using RelyX (3 M ESPE) self-adhesive resin cement and core build up was done using

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Fig. 1. a – Anterior view; b – Occlusal view – Complicated crown-root fracture.

Fig. 2. a – Intra oral periapical radiograph; b – Cone Beam Computerized tomography.
Fig. 3. Splinting done on the upper anterior teeth.

Fig. 4. Mineral trioxide aggregate (MTA) placement.

Fig. 5. Post-operative photograph & radiograph.
composite (Filtek™ Supreme Ultra 3 M ESPE). Crown was fabricated on 11 and 21 using indirect composite resin [Fig. 5]. The patient was kept under follow up every three months for the next two years to check for further complications [Fig. 6].

Discussion

Complicated crown-root fracture involves enamel, dentine, cementum and pulp. The severity of fracture depends on the force of impact and the type of vector acting on the tooth, strength of the impact force and its vector. The various factors that affect the prognosis are based on the extent of injury to the periodontal ligament, crown root ratio, and the extent of fracture [1,4].

The treatment modalities in treating crown root fracture depend on the extent of fracture line and the encroachment on to the biologic width. If the biologic width is encroached by the fracture line prior to restoration the primary aim will be reestablishment of the biologic width. The most common procedure that aid in such management would be either orthodontic extrusion or surgical extrusion of tooth [5–7].

In the present case, the fractured coronal fragments were removed, and the fracture line was found to be extending 5 mm subgingivally on the palatal aspect, which encroached into the biologic width. Considering the age, emotional aspect and stage of root development of the patient, it was decided to surgically extrude the tooth followed by 180° rotation. This rotation aids in the fact that palatal subgingival root fracture will become supragingival because of the contour. This treatment prevents the ingrowth of gingival tissues into the fracture line as well as maintaining the biological width. The orthodontic extrusion takes longer time compared to surgical extrusion and may be difficult to control in some cases, so surgical extrusion was performed in this case. The potential complications that can arise due to this procedure are root resorption and ankylosis [8]. The presence of intact periodontal ligament cells and minimal extra oral dry time minimizes the risk of root resorption and ankylosis [9]. Splinting of intentionally replanted tooth facilitates excellent periodontal cell repair. In regard to this the tooth was well adapted to the socket and periodontal support was provided by splinting [10].

In our present case, luxated tooth was intentionally replanted at 180° clockwise, splinted and obturated well. Following 2 weeks the incident, during the review visit, apexitification with mineral trioxide aggregate was performed successfully. One week later, glass fibre post, composite core built up and crown fabrication was done. Patient was reviewed every three months for the next two years without any complications.

Conclusion

Complicated crown root fractures are difficult to manage due to its involvement of different tooth supporting tissues. The most important factor that should be considered while doing intentional intra alveolar replantation is the extent of the fracture line subgingivally and minimal damage to periodontal ligament. Intentional intra alveolar replantation is a viable treatment option as it provides immediate treatment outcomes compared to other treatment options in restoring patient’s esthetics.
Conflict of interest

Nil.

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