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CASE REPORT

Management of complicated crown and root fracture: A case report

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ABSTRACT:
Trauma to the anterior teeth and their supporting tissues is relatively common among children and adolescents. A crown-root fracture is a type of dental trauma, usually resulting from horizontal impact and represents 5% of all dental injuries. These fractures involve enamel, dentin and cementum, occurring below the gingival margin. Herein, we presented a clinical case of management of complicated crown and root fracture using a multidisciplinary approach. A 15-year-old female patient reported to the department of Conservative Dentistry and Endodontics. Uncomplicated crown fracture was present with respect to 21. Root canal treatment, post and core followed prosthesis was planned for 11 and for 21 composite restoration was planned. This case report demonstrates that reattachment of tooth fragments can successfully benefit periodontal health, esthetic needs and normal functioning of the tooth. However; further research in this field of dentistry is recommended.
Key words: Complicated Crown, Fracture, Root

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INTRODUCTION

Trauma to the anterior teeth and their supporting tissues is relatively common among children and adolescents. Accidental fall or trauma during contact sports is the main reasons for injury. The maxillary central incisors are most often injured in the accidents and boys are affected more than the girls. Every dental professional must be prepared to evaluate and treat them when necessary. Factors influencing the management of traumatized tooth include extent and pattern of fracture, pulpal involvement, stage of root development, alveolar bone fracture, and involvement of biologic width, soft-tissue injuries, presence/absence of fractured tooth fragment, secondary traumatic injuries, occlusion, and esthetics.[1-3]

A crown-root fracture is a type of dental trauma, usually resulting from horizontal impact and represents 5% of all dental injuries. These fractures involve enamel, dentin and cementum, occurring below the gingival margin. Depending on the presence or absence of pulpal involvement, they are classified as complicated or uncomplicated fractures. A crown-root fracture often involves the biologic width. Biologic width is the sum of the lengths of epithelial and connective tissue attachment to the tooth.[4-6] Crown-root fractures extending apically towards both the gingival margin and the alveolar crest pose a great challenge.[7] Herein, we present a clinical case of management of complicated crown and root fracture using a multidisciplinary approach.

CASE REPORT

A 15-year-old female patient reported to the department of Conservative Dentistry and Endodontics Post Graduate Institute of Dental Sciences, Rohtak, Haryana 1 hour after the road side accident. Complete medical, dental and trauma history was taken. On clinical examination of 11 the fractured segment was mobile with the involvement of pulp and negative to electric pulp test [Fig 1(A)]. Uncomplicated crown fracture was present with respect to 21 [Fig 1(A)]. Periapical radiographs (PA) were taken at different angulations. PA radiograph revealed mature root and complicated crown and root fracture of maxillary right central incisor and uncomplicated crown fracture of left maxillary central incisor [Fig 1(B)]. Local anesthesia was achieved with 2% lignocaine hydrochloride with epinephrine 1:80,000 (ICPA Health Products Ltd, Ankleshwar, India). The fractured segment was removed and palatal flap was raised. The fracture was extending

subgingivally and there was more that 50% loss of tooth structure [Fig 1(C)]. Root canal treatment, post and core followed prosthesis was planned for 11 and for 21 composite restoration was planned. A single sitting root canal treatment was performed. Post space was prepared and prefabricated metal posts was cemented into the canal after checking its fit. After maintaining proper isolation composite core build up was done with the standard protocol of etching (Ivoclar Vivadent Eco Etch), bonding (Ivoclar Vivadent TE-Econom Bond) was followed and incremental composite (Ivoclar TE-Econom Flow) build up was done and radiograph was taken. [Fig 1(D, E)]. Patient was put on follow up and recalled after 2 weeks. On 2nd appointment composite build up was done for 21 and crown cutting was done for 11. Prosthetic rehabilitation was done by metal ceramic crown placement and radiograph was taken [Fig 1(F, G)]. Patient was put on follow up for 12 months [Fig 1(H)].

DISCUSSION

Dental injuries predominantly occur during the first two decades of life with the majority of these injuries affecting the maxillary incisors. Crown-root fracture is a type of fracture that involves the enamel, dentin and cementum. Early loss of an incisor in a child might bring about esthetic and psychological problems; in addition, it might result in the development of malocclusion, with negative effects on the alveolar bone. A treatment plan involving different dental specialties (i.e. pedodontics, endodontics, oral surgery, orthodontics and operative dentistry) must be designed for optimal treatment of the affected teeth. Implementing the restorative principles together with proper management of periodontal tissues can ensure long-term survival of the injured tooth. A number of treatment modalities are available for crown-root fractures, depending on the position, extent and severity of fracture.[6- 9] Herein, we presented a clinical case of management of complicated crown and root fracture using a multidisciplinary approach.

In the present case report, a 15-year-old female patient reported to the department of Conservative Dentistry and Endodontics 1 hour after the road side accident. On clinical examination of 11 the fractured segment was mobile with the involvement of pulp and negative to electric pulp test. Local anesthesia was achieved with 2% lignocaine hydrochloride with epinephrine 1:80,000. The fractured segment was removed and palatal flap was raised. Root canal treatment, post and core followed prosthesis was planned for 11 and for 21 composite restoration was planned. Post space was prepared and prefabricated metal posts were cemented into the canal after checking its fit. Mokhtari S et al reported a successful treatment of a complicated crown-root fracture. They presented a case of complicated crown-root fracture of tooth number 11 in a ten-year-old boy. Intentional replantation with 180° rotation and slight extrusion and fixation was performed. Intentional replantation with 180° rotation is a valuable treatment for crown root fractures. The management of complicated crown-root fracture using intentional replantation with 180° rotation can help to maintain natural dentition and interdental papilla.[10]

Figure 1: (A, B) Pre-operative clinical picture and radiograph. (C) Intra operative clinical picture after segment removal. (D, E) Clinical picture and radiograph after post cementation and core buildup of 11 and composite restoration of 12. (F, G) Post-operative clinical picture and radiograph (H) Follow up at 12 months.

In the present case report, fter maintaining proper isolation composite core build up was done with the standard protocol of etching, bonding was followed and incremental composite build up was done and radiograph was taken. Patient was put on follow up and recalled after 2 weeks. On 2nd appointment composite build up was done for 21 and crown cutting was done for 11. Prosthetic rehabilitation was done by metal ceramic crown placement. Excellent prognosis was observed on I year follow-up. A comprehensive diagnosis and meticulous treatment planning are essential for the management of complicated crown-root fractures which could be attempted by extraction followed by the implant, surgical extrusion, crown lengthening, and orthodontic extrusion. Extraction should not be the first choice because every attempt should be made to preserve the natural teeth. Surgical extrusion is a simple, less consuming procedure but the main drawback is the risk of root resorption because of the damage to the periodontal ligament. Literature shows that orthodontic extrusion has proven excellent results.[9-11]

Kulkarni VK et al presented a case of complicated crown-root fracture of permanent maxillay left central incisor, involving the biologic width in a 10-year-old girl. The traumatized tooth was treated endodontically. Access to the subgingival margins was gained by orthodontic extrusion followed by gingivectomy. The fractured fragment was reattached using bonding system and composite resin.[12] Kanimozhi I et al, presented the case report of the traumatised teeth that surgically extruded followed by the extraction of mobile tooth fragment in the coronal portion, splinted and stabilised. In the next appointment, the teeth were treated with pulpectomy and coronal restoration. On eight-week follow-up, the tooth exhibited no clinical signs of failure, such as mobility, tenderness, or pain. The outcome was successful in this case at one year, as there was no underlying pathology in the follow-up period suggesting no risk for the underlying permanent tooth germ. The long-term success of surgical extrusion depends on the cooperation of the child, the condition of the periodontal ligament, the vitality of the teeth, and the time lapsed following trauma. Thus, the conservative approach in the management of crown-root fracture in primary dentition should be emphasised.[4-6]

CONCLUSION

This case report demonstrates that reattachment of tooth fragments can successfully benefit periodontal health, esthetic needs and normal functioning of the tooth. However; further research in this field of dentistry is recommended.

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