ORIGINAL RESEARCH PAPER

Volume-7 | Issue-2 | February-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CONSERVATIVE AND AESTHETIC REINSTATEMENT OF FRACTURED MAXILLARY INCISORS.

Dental Science

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ABSTRACT

Dental trauma often has a severe impact on the social and psychological well being of a patient. Crown root fracture is the most frequent injury in permanent dentition. Apart from loss of hard tissue, this injury represents a hazard to pulp and periodontal ligament.

This paper reports aesthetic management of fractured maxillary left central incisor tooth at both subgingival and supragingival levels with midline diastema by stabilization of crown segment with semi-rigid fixation, intraradicular splinting using fibre post and FluoroCore 2+ followed by all ceramic crown and composite restoration of maxillary right central incisor.

KEYWORDS

Crown root fracture, fiber reinforced post, monoblock

Introduction

Facial trauma results in fractured, displaced or lost teeth which have paramount negative functional, esthetic and psychological effects on patients. Achieving and maintaining satisfactory treatment results for traumatically fractured incisors is a challenge for the clinician.

Traumatic injuries to a tooth can vary in severity from a simple enamel infraction to a complete ex-articulation of tooth (avulsion). Among these injuries, tooth fracture (crown fractures, crown-root fractures and root fractures) is considered to be the third most common cause of tooth loss.[1]While crown fractures occur most frequently in the permanent dentition, root fractures account for 0.5-7.0% of trauma that occurs in permanent dentition and 2-4 % in decidous teeth.[2]The frequency of root fractures in permanent teeth is only 0.5% to 7% out of which 68% of root fractures occur in the central incisors, 27% in lateral incisors and only 5% of root fractures are found in mandibular incisors.[1,3]

The classification of horizontal root fractures is based on the location of the fracture line (apical third, middle third or cervical third) radiographically and on the degree of dislocation of the coronal fragment.[4]Horizontal root fractures that localize in the middle or apical third of the root present better prognosis when compared with fractures in the cervical third of the root. In maxillary incisors, crown-root fractures have a characteristic fracture line on the facial side; the fracture is localized paragingivally or supragingivally, while palatally, the defect often extends far into the root region.[1]

Crown root fractures require multidisciplinary treatment approaches such as repositioning, immobilization and relief of occlusion.[5] A significant factor which influences healing in case of horizontal fracture is the presence or absence of communication of the fracture line with the oral environment because of contamination from bacteria. Anterior diastema may compromise the harmony of a patient's smile. Patient's demand for aesthetic dentistry with minimally invasive procedures has resulted in the extensive utilization of freehand bonding of composite resin to anterior teeth. The spaces usually distort a pleasing smile by concentrating the observer's attention not on the overall dental composition, but on the diastema.[6] The need for treatment is mainly attributed to aesthetic and psychological reasons, rather than functional ones.

The present case report describes a case of successful conservative and aesthetic reinstatement of fractured maxillary anterior teeth using intraradicular splinting followed by prosthetic restoration and closure of midline diastema using direct composite restoration.

Case Report:

A 22 year old male patient reported to the Department of Conservative Dentistry and Endodontics one week after dental trauma. The patient complained of having suffered from continuous pain in the left maxillary central and lateral incisors for last three days. The patient histories of allergy or systemic problems were non contributory. Electric pulp testing maxillary left central and lateral incisors gave a negative reading whereas maxillary right central responded normally to the electric pulp testing. During extra oral examination, mild swelling was present in the upper lip. Intra oral clinical examination revealed a fractured crown below maxillary left central incisor and Ellis Class II fracture of maxillary right central incisor (Fig. 1a). Radiographic examination revealed horizontal radiolucent line below cementoenamel junction w.r.t. 21 and periapical radioluency w.r.t. 22 (Fig. 1b). Hence the patient was diagnosed with Ellis Class II fracture w.r.t. 11, Ellis Class VI w.r.t. 21 and acute apical periodontal abscess w.r.t. 22. Various treatment options were discussed with the patient but he opted for conservative management. Treatment was initiated by repositioning the coronal segment with finger pressure and using a semi rigid splint 26 gauze round wire and composite (Coltene Brillant NG Universal) under local anesthesia. Access opening and working length (radiographically and apex locator) was determined w.r.t. 21 and 22 after proper stabilization followed by calcium hydroxide dressing. The patient was recalled after 1 week and obturation was done using lateral condensation w.r.t 21 and 22 (Fig.2). After 5 weeks post space was prepared by removing gutta percha using no.2 pezzo drill, leaving apical third intact w.r.t 21. Later splinting was removed, retraction cord was placed and stabilization of fracture segment with artery forceps and intraradicular splinting was done using fibre post and fluoroCore 2+ (Dentsply) w.r.t.21 (Fig.3). The tooth preparation was done next day for all ceramic w.r.t 21 and composite restoration (Coltene Brillant NG Universal) w.r.t. 22 with diastema closure. The patient was called for follow up after 3, 6, 12 and 24 months. The tooth revealed stable reattachment of crown fragments both clinical and radiographically after 2 years (Fig.4).

Fig.1a - Pre operative clinical photograph w.r.t. 11, 21 and 22.

Fig.1b – Pre operative IOPAR w.r.t. 11, 21 and 22.

Fig.2 After obturations IOPA radiograph w.r.t 21 and 22

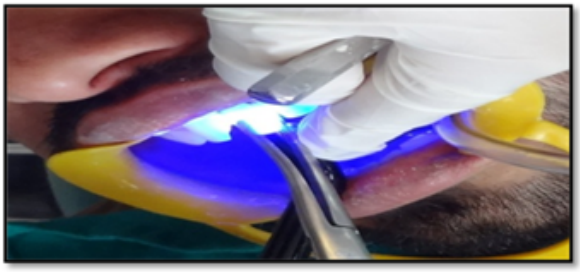

Fig.3 Stabilization of fracture segment with artery forceps and intraradicular splinting using fibre post and fluorocore 2+ w.r.t 21

Fig.4 Clinical photograph and IOPAR after all ceramic crown w.r.t 21 and composite restoration w.r.t 11 and 22 after 2years.

Discussion

Esthetic has an impact on psychology of the adolescent patient when it comes to anterior teeth. Quick restoration of a traumatic tooth may lead to a positive emotional and social response from the patient.

For diagnosing the tooth injuries, a systematic approach with clinical and radiographical examinations is required. Multiple radiographic exposures from several angulations provide the most reliable information about changes in the dento-alveolar complex following traumatic injuries.[7]

Conservative or invasive techniques i.e., stabilization of fragment, crown lengthening, orthodontic extrusion and extraction followed by implant surgery can be used for treating complicated crown root fracture. Various disadvantages with invasive procedures are present for example with crown lengthening includes apical shifting of the gingival margin which may compromise aesthetics whereas with orthodontic extrusion coronal shift of the gingival tissue is present which further partially masks the extent of root extrusion, disparity in levels of epithelial attachment and bone between adjacent teeth and relapse of extruded fragment. The higher cost of indirect restorations, the patient's desire to maintain remaining sound tooth structure and unfavorable anatomical conditions may render the direct restoration the first choice in many clinical situations. The clinicians should look for the techniques that are easy, less time consuming, restore esthetics and improve long term success rates.[8]

Stabilization of tooth was performed using 26 gauze orthodontic wire and composite because the dental crown acted as a temporary during the clinical session related to the endodontic treatment.[9]

In the present case, patient wanted his natural tooth to remain intact therefore conservative and simple techniques were used for treatment purpose. Moreover, reinstating the crown fragment maintained natural shape, contour, surface texture, occlusal alignment and color. It eliminated the problems of differential wear of restorative materials and offered excellent esthetic and functional result while maintaining healthy periodontal attachment.[10]

Recent advancements in adhesive dentistry emphasizes the use of fiber-reinforced resin-based composite posts with dual cure based cement especially with teeth in the esthetic zone such as maxillary anterior teeth.[11] Usage of fiber-reinforced post along with resin cement helps in distribution of stresses along the tooth structure uniformly thus decreasing the chances of post endodontic failure. Because of the isoelastic properties and similar modulus of elasticity of the fiber-reinforced post, resin cement and dentin increases the retention and provides monoblock effect.[12]

In one of the relevant study by Cvek et al concluded that the teeth with cervical horizontal root fracture were prognosed poorly due to the presence of soft tissue in between the fragments. However, healing of the cervical fracture did occur in some teeth making it meaningful and desirable to adopt a conservative treatment approach before other more laborious alternatives are applied. [13]

Conclusion:

The treatment of crown root fracture may be a painful taking job for both dentists and patients. Therefore, an evidence-based clinical approach should be followed for the successful treatment of crown root fractures. A regular follow-up examination of teeth is required to evaluate the success of treatment and to do the necessary alterations in the suggested treatment protocol, if indicated. The pros and cons of a tedious and long conservative therapy should always be weighed against the option of extraction and replacement with other fixed prosthesis.

Acknowledgement

The authors express their gratitude to Dr. Udai Bhanu (Phd) for his guidance and support. The authors deny any conflicts of interest related to this study.

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