INTRODUCTION

Traumatic injuries to teeth and their supporting tissues usually occur in young people aged 6-13 years, with damage varying from enamel fracture to avulsion, with or without pulp involvement or bone fracture. A crown-root fracture comprises 5% of all traumatic injuries.

Maxillary anterior teeth are most often affected and 80% of them are maxillary central incisors. Indication of treatment depends on the level of fracture line and the amount of remaining tooth structure. The subgingivally fractured teeth present a complex treatment strategy due to difficulties preserving the gingival biologic width. They are difficult to restore and hence often extracted. The form and function of the tooth are restored through a comprehensive and multidisciplinary treatment plan. Two methods have been described for root fracture treatment: (1) crown lengthening procedures using periodontal surgery (2) orthodontic extrusion or forced eruption. Extrusion closely resembles natural tooth eruption maintaining a crown-root ratio of approximately 1:1. A force of 0.2-0.3 N is required for extrusion of single-rooted tooth with 2-4 mm movement for central incisor and 4-6 mm for lateral incisor. Biologic width realignment is required to obtain proper gingival and crestal bone contour. The 3-4 mm distance from the alveolar crest to the coronal
extension of the remaining tooth structure has been recommended for optimum periodontal health and proper esthetics. This case report presents a multidisciplinary management of a subgingivally fractured tooth using orthodontic extrusion with removable appliance, re-establishing biological width by periodontal surgery and final restoration using lithium disilicate crown.

CASE REPORT

A 22-year-old male patient reported to the department with the chief complaint of fractured maxillary left permanent central incisor (figure 1).

FIGURE 1: Subgingivally fractured maxillary left permanent central incisor

History dates back to one day when patient met with trauma that caused uncomplicated subgingival fracture of the same tooth at cervical third of the root. Gingival inflammation was reported with respect to a fractured tooth with no mobility and tenderness on percussion. There was no significant past medical history. Clinical and radiographic maxillofacial examination revealed that there was no fracture of the maxilla, mandible, or other facial bones. Further a definite treatment plan was made and explained to patient. Gingivectomy was done it 21 followed by root canal treatment (figure 2). Orthodontic extrusion of the fractured permanent maxillary central incisor was required to move the palatal fracture line approximately 3 mm above the alveolar crest in order to regain the lost biologic width. Orthodontic traction was applied using a maxillary appliance with V-shaped bend with respect to area of maxillary left central incisor and a hook shaped wire placed over fractured tooth (figure 3).

Figure 3: Wire In Shape Of Hook Attached To Fractured Tooth

V-shaped bend was placed approximately 5-6 mm below the alveolar crest level of tooth attached to the adjacent tooth with help of composite (figure 4). Extrinsic force was applied using elastics tied with hook shaped wire and V-bend

Figure 4: V Shaped Bend Given In The Wire

Figure 5: V Shaped Bend And Hook Joined With Elastics
Post space was prepared, and a prefabricated fibre post was cemented in the canal using glass ionomer cement (figure 6). Core build-up was done, and tooth was restored with lithium disilicate crown (figure 7 and 8).

DISCUSSION

The location of fracture line affects the treatment options, clinical outcomes and prognosis of teeth. Fractures in the subgingival area have been found to be the worst because of the loss of the coronal fragment stability and pulpal vitality. Root canal therapy is advised for those teeth in which pulp neurovascular supply is disrupted, to avoid pulp necrosis that can lead to external inflammatory root resorption.

The 3-4 mm distance from the alveolar crest to the coronal extension of the remaining tooth structure has been recommended for optimal periodontal health. There are various treatment options of tooth fracture involving the biologic width root extrusion technique, crown lengthening procedures and combination of both. Considering the maintenance of form and function of the tooth, the orthodontic treatment was planned followed by gingival contouring with reestablishment of biological width. Prefabricated fibre post was cemented into the root canal with luting cement, as it provides the best seal despite their technique sensitivity.

The extrusive force was applied using a removable appliance with a V-shaped bend. This is a simple method of orthodontic extrusion with low-cost factor, and prevention of relapse. Prolonged retention is required for approximately 2 months to prevent relapse.

The major limitation of this treatment is longer duration of treatment and stabilization period. It may also impair good esthetic resolution because the cervical diameter of extruded tooth is smaller than the adjacent teeth.

CONCLUSION

Orthodontic extrusion is a conservative procedure that allows retention of a tooth without the disadvantages of a fixed bridge. Extrusion does not involve loss of bone or periodontal support, as commonly occurs during extraction. Simple surgical crown lengthening involves additional resection of supporting bone, and such osteotomy can sometimes be avoided by use of orthodontic extrusion. Thus, this simple technique can be considered as a savior for both the natural tooth and its supporting tissues.

References


