

CASE REPORT***Orthodontic Extrusion of Subgingivally Fractured Incisor and Prosthetic Rehabilitation: A Case Report.***Ragheeba Ansari¹, Swatantra Agarwal², Abroo Hussain¹, Dipti Nayak¹**ABSTRACT**

Traumatic injuries to the teeth especially in the esthetic region pose a great challenge to a dentist to be able to restore the tooth to proper health and function. Nothing can replace the natural but the natural. Such dental trauma can lead to fracture of the tooth, particularly in the anterior region of the mouth. At times, when the fracture line is below the level of gingiva, the prognosis of such fractured tooth is considered questionable or hopeless. With the recent trend and attitude towards dental implants, extraction remains the common treatment modality. This, however, should be considered as the last option, and every attempt should be made to preserve and restore the natural tooth structure. Such treatment modalities involve a multi-disciplinary approach including endodontics, periodontal crown lengthening and/or orthodontic extrusion followed by prosthetic rehabilitation. The major problem with sub-gingival fracture is absence of adequate coronal ferrule and a compromised biological width. This usually complicates the application of the rubber dam during endodontic treatment. Periodontal crown lengthening involves the removal of supporting crestal alveolar bone while orthodontic intervention forcibly extrudes the tooth. Both are attempts to expose sufficient coronal tooth structure for proper prosthetic restoration. The prime objective of tooth extrusion or forced eruption is to provide both a sound tissue margin for ultimate restoration and to create a periodontal environment (biological width) that will be easy for the patient to maintain. This article illustrates a case report for prosthodontic rehabilitation of orthodontically extruded subgingivally fractured incisor.

Keywords: forced extrusion, post and core, lithium disilicate crown.

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 pulpal involvement or bone fracture.¹ 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.¹ 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 methods³⁻⁵ 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.⁶ 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

1. Post Graduate Student.

2. Principal and Head of department

Department of Prosthodontics and Crown & Bridge

***Correspondence Address:**

Dr. Ragheeba Ansari (P.G. Student) Kothiwal

Dental College and Research Centre, Mora

Mustaqeem Moradabad.

Email:ansariragheeba@gmail.com

extension of the remaining tooth structure has been recommended for optimum periodontal health and proper esthetics.⁷ 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 irt 21 followed by root canal treatment (figure 2). Orthodontic extrusion of the fractured permanent maxillary central



FIGURE 2: After Gingivectomy And Root Canal Treatment

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). Extrusive force was applied using elastics tied with hook shaped wire and V-bend



Figure 4: V Shaped Bend Given In The Wire

. Elastics were changed every week to assure continuous traction force and regular oral hygiene maintenance. An extrusion of 3 mm was obtained in 2 months, which was appreciated clinically and radiographically (figure 5).



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).



Figure 6: Fiber Post and core build up



Figure 7: Lithium Disilicate Crown



Figure 8: Cemented Prosthesis

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.⁸ 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.⁷ There are various treatment options of tooth fracture involving the biologic width root extrusion technique, crown lengthening procedures and combination of both.⁴ 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

1. Zerman N, Cavalleri G. Traumatic injuries to permanent incisors. *Endod Dent Traumatol* 1993;9:61-4.

2. Ulusoy AT, Tunc ES, Cil F, Isci D. Multidisciplinary treatment of a subgingivally fractured tooth with indirect composite restoration:
3. A case report.. J Dent child Delivanis P, Delivanis H, Kuftinec MM. Endodontic, orthodontic management of fractured anterior teeth. *Jam Dent Assoc* 1978;97:483-5
4. Johnson RH. Lengthening clinical crowns. *J Am Dent Assoc* 1990;121:473-6.
5. Ivey DW, Calhoun RL, Kemp WB, Dorfman HS, Wheless JE. Orthodontic extrusion: Its use in restorative dentistry. *J Prosthet Dent* 1980;43:401-7
6. Andreasen JO, Andreasen FM. Textbook and Color Atlas of Traumatic Injuries to the Teeth. 4th ed. Oxford: Blackwell; 2007.
7. Potashnick SR, Rosenberg ES. Forced eruption: Principles in periodontics and restorative dentistry. *J eruption: principles In periodontics and Restative dentistry. J Prosthet Dent* 1982;48:141-8 Dent 1982;48:141-8.
8. Welbury R, Kinirons MJ, Day P, Humphreys K, Gregg TA. Outcomes for root-fractured permanent incisors: A retrospective study. *Pediatr: . Pediatr Dent* 2002;24:8-102. *Dent* 2002;24:98-102.