CASE REPORT

MANAGEMENT OF COMPLICATED CROWN ROOT FRACTURE BY SURGICAL EXTRUSION

Pallavi S Pujar, Suryakanth M Pai, VV Subbareddy

ABSTRACT

Complicated crown-root fractures present lot of problems for coronal restorations. This case report presents the management of crown root fracture with surgical repositioning of the tooth occlusally followed by restoration of the tooth with custom made post and core and porcelain fused to metal crown.

Keywords: Coronal Restoration; Crown-Root Fracture; Splinting; Surgical Repositioning; Trauma

Introduction

Coronal crown fractures are more common in the permanent dentition compared to the intrusive luxation injuries in the primary dentition.1,2 Coronal crown fractures is unfavorable when the fracture line extends below the marginal bone level. Orthodontic or surgical extrusion to save such teeth has been recommended.3 Surgical extrusion is a one step procedure, is simpler and less time consuming than orthodontic appliances.4,5 This paper describes the management of a cervical root fracture of a mature central incisor by surgical repositioning followed by esthetic rehabilitation.

Case Report

A 14-year-old male of Asian origin reported to the Department of Pediatric Dentistry, College of Dental Sciences, Davangere, Karnataka with the chief complaint of broken tooth in the front region of the upper jaw for last 6 months. History reveals a fall from bicycle with no history of loss of consciousness, vomiting or neurological deficit immediately after the fall. Clinical inspection showed a crown root fracture of the left maxillary central incisor and an unhealed socket with few soft tissue lacerations of the gingiva (Figure 1).

The intraoral periapical radiograph revealed that left permanent incisor had crown root fracture 4 mm below the marginal bone (Figure 2). The root formation of the fractured tooth was completed with a closed apical foramen and no periapical changes. The possible treatment modalities for this case were discussed with the parents, and immediate surgical repositioning was elected as the treatment of choice. The patient was co-operative, had good health conditions, and there was no contraindications to surgery. The parents were fully informed about the surgical procedure, and written informed consent was obtained.

Adequate anesthesia was achieved with 2% lignocaine hydrochloride. Exposed root canal was irrigated using saline. Calcium hydroxide was used as an intracanal medicament and the access cavity was restored with glass ionomer cement. Gingival decollation was gently performed by crevicular incision and a vestibular flap was elevated. The fractured incisor was repositioned 4 mm occlusally with gentle rotational movements(Figure 3). No luxation movements were made against the alveolar walls to prevent further damage to the periodontal ligament. Immediate postoperative IOPA radiograph was taken to confirm the amount of extrusion. Interdental sutures were placed and surgical dressing with CoePak® was given. Subsequently fractured tooth was immobilized in this position by means of composite semi-rigid splint. 0.016 × 0.016 inch mm nickel–titanium orthodontic wire was used, isolation was achieved using cotton rolls and adhesion areas for the splint were prepared with single-step bonding on the labial surfaces of the repositioned tooth and neighboring teeth. A thin layer of composite resin was applied on the enamel surfaces to position the wire and a composite resin was used to splint till the permanent canines on either side. Antibiotic therapy was administered for seven days. The patient was instructed regarding eating habits and was encouraged to maintain good oral hygiene with careful tooth brushing, flossing, and mouth rinsing with 0.12 % of chlorhexidine mouthwash.

Endodontic therapy was initiated one week postoperatively. Access cavity was redesigned from the lingual side as the splint present on the labial side. Root canal was instrumented with step-back technique and copiously irrigated with 2.5% sodium hypochlorite. The canal was filled with calcium hydroxide based paste for disinfection of the root canal. The patient was called after one week. Working length X-ray was taken and biomechanical preparation was completed. In the subsequent appointment the tooth was obturated with gutta-percha. The splint was removed in the same appointment after 2 weeks. Post canal space preparation was done, and a custom made metal post and core was fabricated and a temporary acrylic crown was cemented. It was found that there were midline shift and the right central incisor was migrated mesially due to the space created by the trauma. There was also sufficient space distal to right lateral incisor. Hence a removable appliance with a finger spring was fabricated for the distal movement of maxillary right central and lateral incisor (Figure 4). The labial bow was incorporated to control the labial movement of the teeth. The appliance was activated once in three days. 2 mm of space was gained with the finger spring by distal movement of the right maxillary central and lateral incisor and the space for the coronal restoration was created (Figure 5). The tooth was restored with porcelain fused to metal crown (Figure 6). The tooth is symptomless after two years of follow up (Figure 7).
ceptable. A well-planned and limited avulsion in the present width of adjacent central incisor to make it esthetically ac
spring was done once in three days. Labial bow was incorpo
regained by the use of finger spring. Activation of the finger
the coronal restoration of the central incisor. Hence space was
derlying pathology. There was no optimum space available for
in relation to root resorption, periapical destruction, ankylosis,
Kahnberg described two different extrusion techniques. A
piece of bone transplanted from the nasal spine region or ad
jacent alveolar process is positioned above the root after ex
trusion to secure the new position. The second technique in
volves careful extrusion of the tooth by marginal luxation and
stabilization by interdental suturing and surgical dressing. The
second technique is expected to have more favorable results in relation to root resorption, periapical destruction, ankylosis,
and marginal bone loss. Hence the second technique of care
ful extrusion was used.

Cengiz et al. in an in vitro study evaluated the effect of splint
type on stresses occurring around traumatized teeth with three different semi-rigid splints and advised the use of orthodontic wire-composite splint to create the lowest stress around traumatized teeth.11 Thus, a wire-composite functional splint was used in the case. Calcium hydroxide paste proved to be efficient in arresting external inflammatory resorption.1

The tooth healed uneventfully and showed no clinical and ra
diographic signs of mobility, tenderness, pain or any other un
derlying pathology. There was no optimum space available for the coronal restoration of the central incisor. Hence space was regained by the use of finger spring. Activation of the finger spring was done once in three days. Labial bow was incorpor
ated to control the labial movement of the teeth. About 2.5
mm of the space was gained, so that the mesio-distal mea
surement of the restoration matches with the mesio-distal
width of adjacent central incisor to make it esthetically ac
ceptable. A well-planned and limited avulsion in the present
case definitely preserved periodontal ligament vitality, and the treatment outcome was a success, with functional healing. Indicators of functional healing have been defined as no root re
sorption, mobility within normal limits, intact lamina dura on radiographs, and absence of radiographic sign for root re
sorption.13-15 All of these factors were true in the present case (Figure 6).

Conclusion
In conclusion, a favorable response of the tooth can be ex
pected when surgical extrusion is planned for the treatment of the crown root fractures rather than meticulous extraction and replacement of the tooth while restoring esthetics and as a
duty of a pediatric dentist to maintain the confidence of the
child in its growing age.

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