Orthodontic-surgical Management of an Impacted Dilacerated Maxillary Central Incisor: A Clinical Case Report

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Abstract

Dilaceration is one of the causes of maxillary central incisor eruption failure. Surgical excision is frequently the first choice of treatment for a severely dilacerated incisor. In this article, the case of a horizontally impacted and dilacerated maxillary central incisor was diagnosed and treated by surgical exposure using the apically repositioned flap technique combined with orthodontic traction. The dilacerated incisor was successfully moved into alignment, with pulpal vitality and periodontal health present 2 years following treatment. (*Pediatr Dent.* 2004;26:341-344)

KEYWORDS: IMPACTED DILACERATED CENTRAL INCISOR, APICALLY REPOSITIONED FLAP, ORTHODONTIC TRACTION

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Dilaceration is one of the causes of permanent central incisor eruption failure. The cause of incisor dilacerations, however, is not yet clearly understood. Traumatic injury to the primary predecessors[1,2] and ectopic development of the tooth germ[3] are 2 commonly cited causes of this anomaly.

The treatment of dilacerated anterior teeth usually involves surgical excision with subsequent orthodontic methods to either close the space or keep it open until the patient reaches an age when definitive implants or prosthodontic treatments may be used. Both methods have associated problems: orthodontic space closure is seldom indicated nor aesthetically satisfactory, while removable prosthetic replacement during childhood and adolescence may be unsatisfactory for psychological reasons.

Orthodontic traction of impacted dilacerated teeth into the arch has been reported in the literature.[4] In this article, the case of a horizontally impacted and dilacerated maxillary central incisor was diagnosed and treated by surgical exposure using the apically repositioned flap technique combined with orthodontic traction. The dilacerated incisor was moved successfully into alignment.

Case report

A general dentist referred an 8-year-old Chinese boy to the Department of Orthodontics, National Dental Centre, for noneruption of the maxillary left central incisor. The child had no relevant medical history, and the parents could not recall any history of dental trauma. The boy had a history of digit sucking, which he stopped at the age of 6.

Diagnosis

The patient presented with a skeletal Class I pattern and a Class I incisor relationship. Analysis of the cephalometric radiograph revealed normal cephalometric values, according to Chinese norms. Intraoral examination revealed that the dentition was in the transitional period, and dental caries was present in several deciduous teeth. The maxillary arch was constricted, and an anterior open bite was present (Figure 1). The noneruption of the left permanent maxillary central incisor had resulted in drifting of the adjacent teeth with resultant midline deviation. The impacted incisor's crown was palpable as a labial bulge high in the sulcus.

Radiographs showed an impacted left maxillary central incisor with root dilaceration close to the apical third (Figures 2 and 3). The crown-root angle of the dilacerated root was judged to be about 45 degrees.

Treatment options

Several treatment options were considered:

1. surgical excision of the impacted incisor and subsequent restoration with a bridge or implant after orthodontic space opening when growth had stabilized;

Figure 1. Pretreatment intraoral photograph shows the noneruption of the maxillary left central incisor.

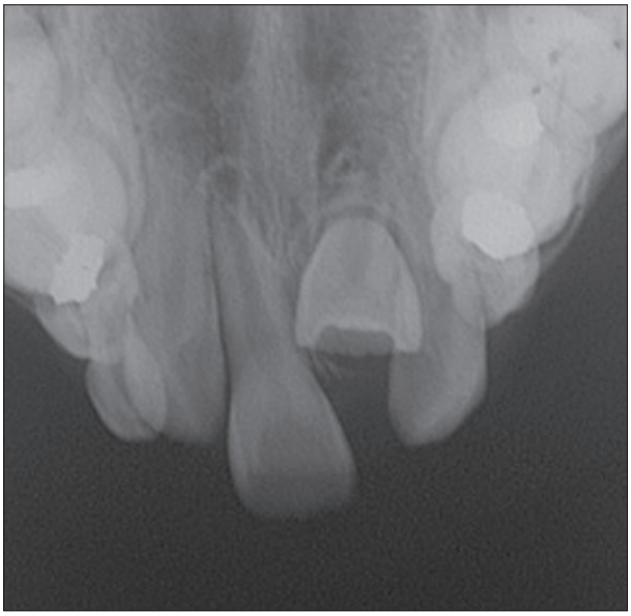

Figure 3. Pretreatment maxillary anterior occlusal radiograph reveals impacted left maxillary incisor.

2. surgical excision of the impacted incisor, orthodontic space closure, and prosthodontic restoration of the left lateral incisor as the central incisor at a later stage;
3. orthodontic space opening, uncovering the impacted tooth using the apical repositioned flap, and orthodontic traction into proper alignment.

Treatment progress

The treatment options were explained to the parents, and it was decided to attempt to bring the tooth into alignment after dental caries management. The patient was referred to the general dentist for carious deciduous teeth restoration. A fixed appliance was subsequently placed on the upper arch by the orthodontist to create adequate space for the impacted central incisor. Bands were placed on the upper first molars, and orthodontic brackets were limited to the 3 permanent anterior teeth (Figure 4).

Figure 2. Pretreatment cephalometric radiograph discloses dilacerated maxillary incisor.

The patient was referred to the periodontist for exposure of the impacted incisor once adequate space was achieved. Using local anesthesia, a full thickness mucoperiosteal buccal flap was raised to expose the crown's palatal surface. The flap was repositioned apically and sutured (Figure 5). The patient was reviewed 8 days later, and, subsequently, orthodontic traction was started. An orthodontic attachment was bonded on the uncovered tooth's exposed palatal surface. Light orthodontic force was applied to bring the incisor occlusally into the arch. As the tooth responded to the force, it rotated downwards as it migrated occlusally.

When the labial surface was exposed after 3 months of active traction, an orthodontic bracket was bonded on the labial surface and light extrusive force was applied to the labial attachment. By the ninth month of treatment, the incisor was brought into alignment (Figure 6) and labial root torque was initiated to achieve ideal tooth angulation.

Results

Through a combination of the apically repositioned flap and orthodontic traction, the impacted left maxillary central incisor was successfully positioned into proper alignment in the dental arch. After treatment completion, the exposed incisor had an acceptable gingival contour and attached gingiva, although it had a slightly longer crown height (Figure 7). The dilacerated root, however, was mildly palpable labially underneath the alveolar mucosa. Radiographically, the newly positioned incisor revealed a

Figure 4. Frontal view showing fixed appliances on the maxillary arch.

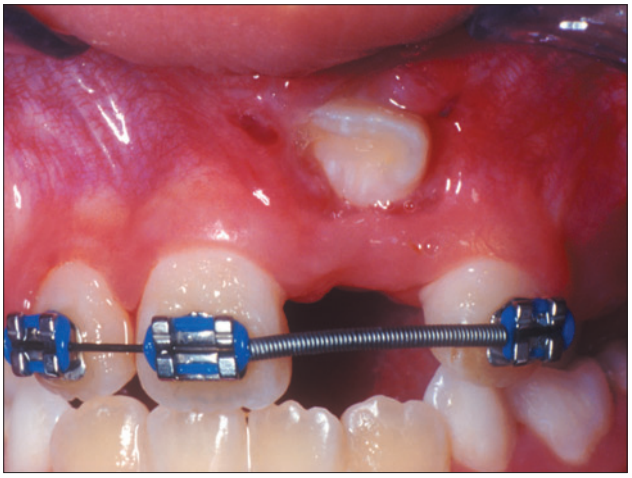

Figure 5. Surgical exposure of the impacted left central incisor using the apically positioned flap.

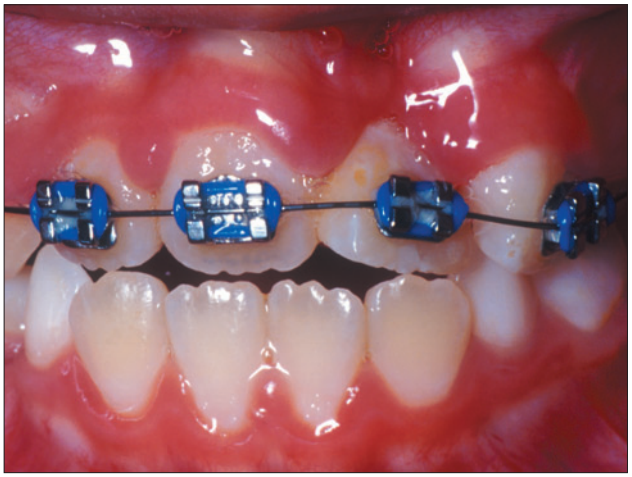

Figure 6. Frontal view shows the left central incisor moved orthodontically to the occlusal level.

Figure 7. Frontal view at the completion of this phase of treatment.

dilacerated root with no apparent root resorption (Figures 8 and 9). The tooth has been asymptomatic and pulp testing showed a vital pulp at the 2-year follow-up.

Discussion

The impacted maxillary incisor is of concern in the first transitional period because noneruption of the tooth can cause subsequent space problems in the anterior region. Studies have shown that proper crown exposure surgery and orthodontic traction can be used to successfully manage impacted maxillary anterior teeth.[5-7] Reports on the management of severely dilacerated anterior teeth, however, are few.[8,9] This could be due to the clinical difficulty of bringing the affected tooth into position. When told of the guarded prognosis, parents may also prefer to remove the tooth and have a replacement prosthesis done instead.

The surgical removal of dilacerated central incisors in children and adolescents is not always a satisfactory therapy, as postsurgical orthodontic and prosthodontic care are protracted and costly and may have psychological consequences. Several clinicians have reported some success with surgical repositioning of the impacted dilacerated tooth,[10,11] but these are limited to case reports. The surgical exposure and subsequent orthodontic traction of impacted dilacerated anterior teeth is another treatment option that would yield satisfactory results with proper case selection and carefully planned procedures.

The degree and level of dilaceration, tooth's vertical position, and tooth's root maturity are factors determining the success rate of orthodontic-surgical management of the impacted dilacerated tooth. A dilacerated tooth with a more occlusal position in the alveolus, an obtuse crown-root angulation, and incomplete root formation would have a better prognosis for orthodontic traction. Dilaceration at the level of the root's apical third would also improve the prognosis.

The proper alignment of the dilacerated incisor's crown necessitated the labial positioning of the root apex. In cases where the crown-root angulation is obtuse, the incisor would be aligned without the root apex becoming palpable in the labial sulcus. Only in exceptional circumstances where the root curvature is very acute will this possibility become a reality. Becker[12] suggested the amputation of the root apex in such cases, with subsequent obliteration of the root canal using a combined coronal and retrograde endodontic

Figure 8. Post-treatment maxillary anterior occlusal radiograph reveals aligned but dilacerated left central incisor.

Figure 9. Post-treatment cephalometric radiograph discloses mildly dilacerated maxillary incisor.

approach. In this case study, the surgical intervention was not performed, as the affected tooth has been asymptomatic and vital during the follow-up. The root apex, however, was mildly palpable in the labial sulcus. Long-term follow-up is necessary to monitor the affected tooth and evaluate the necessity for root amputation and endodontic treatment.

The flap design in this case used the apically repositioned flap technique, which places the flap apical to the original location on the tooth to ensure a band of attached gingiva around the exposed crown.[13] One advantage of this surgical technique is that the tension introduced during the surgical flap's suturing applies a gentle downward force on the crown's labial aspect, so that occlusal migration is initiated immediately following surgery. It has been reported, however, that this technique tends to create more negative aesthetic effects (increased crown height and gingival scarring) when compared to the closed-eruption surgical technique.[14] In this case, by using proper surgical and orthodontic techniques, the periodontal status of the exposed incisor after orthodontic treatment revealed an acceptable gingival contour and attached gingiva with absence of scarring.

Conclusions

This article describes the successful utilization of the apically repositioned flap and orthodontic traction in the treatment of a severely impacted dilacerated incisor. At the 2-year follow-up, the tooth was asymptomatic, vital, and periodontally healthy.

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