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\textsuperscript{1,2} and ectopic development of the tooth germ\textsuperscript{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.\textsuperscript{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 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
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).

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
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 prosthetic 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 4. Frontal view showing fixed appliances on the maxillary arch.](image)

![Figure 5. Surgical exposure of the impacted left central incisor using the apically positioned flap.](image)

![Figure 6. Frontal view shows the left central incisor moved orthodontically to the occlusal level.](image)

![Figure 7. Frontal view at the completion of this phase of treatment.](image)
Management of dilacerated 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. 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. 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.

References


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.