

# CASE REPORT

## Eruption of an Impacted Maxillary Central Incisor with an Unusual Dilaceration

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**D**ilacerations are most common in the maxillary anterior region,<sup>1</sup> occurring in an estimated 3% of the adult population and in six times as many females as males.<sup>2</sup> Trauma has been suggested as an etiological factor, but even if traumatic episodes involving the developing dentition are underreported, many studies have found no history of trauma in cases of dilaceration. In addition, only a single central incisor is usually dilacerated; if trauma were the sole contributing factor, the adjacent incisors would also be expected to be involved.<sup>2</sup>

The most common orientation of a dilacerated maxillary central incisor is with the crown

directed upward and labially. Because dilacerations have been observed in teeth with no predecessors, they may be caused by ectopic development of the tooth germs.<sup>2</sup>

Treatment depends on the degree of dilaceration, the position of the tooth, and the patient's motivation. A dilacerated tooth can be moved into position in the arch if sufficient traction can be applied to the crown. The cements/enamel junction must be avoided, however, to protect the periodontal health of the tooth.<sup>3-7</sup>

In the following case of an unusual dilaceration, the impacted maxillary central incisor was brought into the arch with a closed-eruption technique.

### Diagnosis

A 10½-year-old female was referred with an unerupted maxillary permanent left central incisor. The patient was in the mixed dentition, with a Class I molar relationship and a proclined maxillary right central incisor (Fig. 1). The overjet was 3mm, and the overbite was less than normal.

Space loss had occurred in the region of the unerupted central incisor. There was no history of trauma to the deciduous predecessor, and the adjacent incisors were normal in morphology and vitality. A palpable bulge in the anterior part of the palate suggested that the impacted incisor root was dilacerated toward the palatal side. Radiographic examination showed the dilacerated incisor with its crown rotated more than 100°, its incisal tip just below the floor of the nose, and its palatal surface facing labially.

### Treatment Progress

To avoid contact of the permanent canines with the rotated incisor roots, a removable upper

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**Fig. 1** 10½-year-old female patient with unerupted maxillary permanent left central incisor before treatment.

expansion plate was prescribed for arch-width development in the canine region. The upper right central and both lateral incisors were bonded, and the anterior segment was aligned with an .016" stainless steel sectional wire.

A labial flap was raised in the upper incisor area under local anesthesia. A button with an attached silver chain was then bonded to the more accessible palatal side of the exposed incisal tip (Fig. 2), using a light-cured adhesive for maximum strength. A tension gauge was used to verify that the bond strength was at least 100g. The flap was closed with

silk sutures, which were removed one week later.

Buccal tubes were bonded to the upper first molars with light-cured adhesive, and an .018" stainless steel alignment wire was placed. The silver chain from the dilacerated incisor was lightly tied to the archwire with power chain (Fig. 3). A coil spring was threaded over the archwire to create space for the impacted incisor.<sup>8</sup>

The upper right central and lateral incisors were tied together, and traction was continued to an .019" × .025" stainless steel archwire and then a full-size

.021" × .026" stainless steel wire. The silver chain was carefully cut at each visit until the lingual button had erupted. The chain was then removed, and the button was ligated directly to the main archwire (Fig. 4). As soon as possible, the button was moved from the lingual to the labial side of the crown (Fig. 5).

An .016" nickel titanium overlay wire was inserted to align the upper left central incisor, with the coil spring left passively in place for space maintenance. When a bracket could be bonded to the incisor and the overlay wire was engaged,

however, the tooth was so high that the palatal bulge from the dilaceration became even more prominent. The traction was then stopped, and a step-up bend was made in the full-size archwire mesial and distal to the upper left central incisor, with labial root torque incorporated to maintain the vitality of the tooth. A plastic sleeve was placed over the archwire between the central incisors to prevent irritation of the frenum (Fig. 6).

Once the palatal bulge had been reduced, the incisor traction was resumed. When the impacted incisor had reached its normal level in the arch, the other erupted teeth were bonded, and an .016" nickel titanium archwire was placed for initial alignment. An .017" × .025" copper nickel titanium archwire was inserted after the upper second premolars and canines were bonded.

An .022" × .028" standard edgewise appliance was used for six months of finishing. A fixed lingual retainer was bonded to the upper incisors and will be left in place for three to four years to ensure hard-tissue remodeling and restoration of the soft-tissue attachment.

## Results

Total treatment time was about 19 months. Post-treatment records showed a functionally and esthetically acceptable upper left central incisor (Fig. 7).

A dilacerated root is more resistant to extrusion than a normal root, so that even with light forces, hyalinization in the region



**Fig. 2** Lingual button with attached silver chain bonded to exposed incisor tip.



**Fig. 3** Silver chain lightly tied to main archwire with power chain.

of the deformed root will make the area more prone to resorption.<sup>9</sup> With the amount of root movement required in this case, some resorption was inevitable.

## Conclusion

The approach presented here avoids extraction and prosthetic replacement of the dilacerated tooth. The major advantage of the closed-eruption method over direct bonding of the impacted incisor is that it maintains the attached gingiva.

A coordinated, multidisciplinary approach is required in the management of patients who present with unerupted, dilacerated incisors. Intervention should be as early as possible, so that



**Fig. 4** Lingual button ligated directly to main archwire after removal of silver chain.



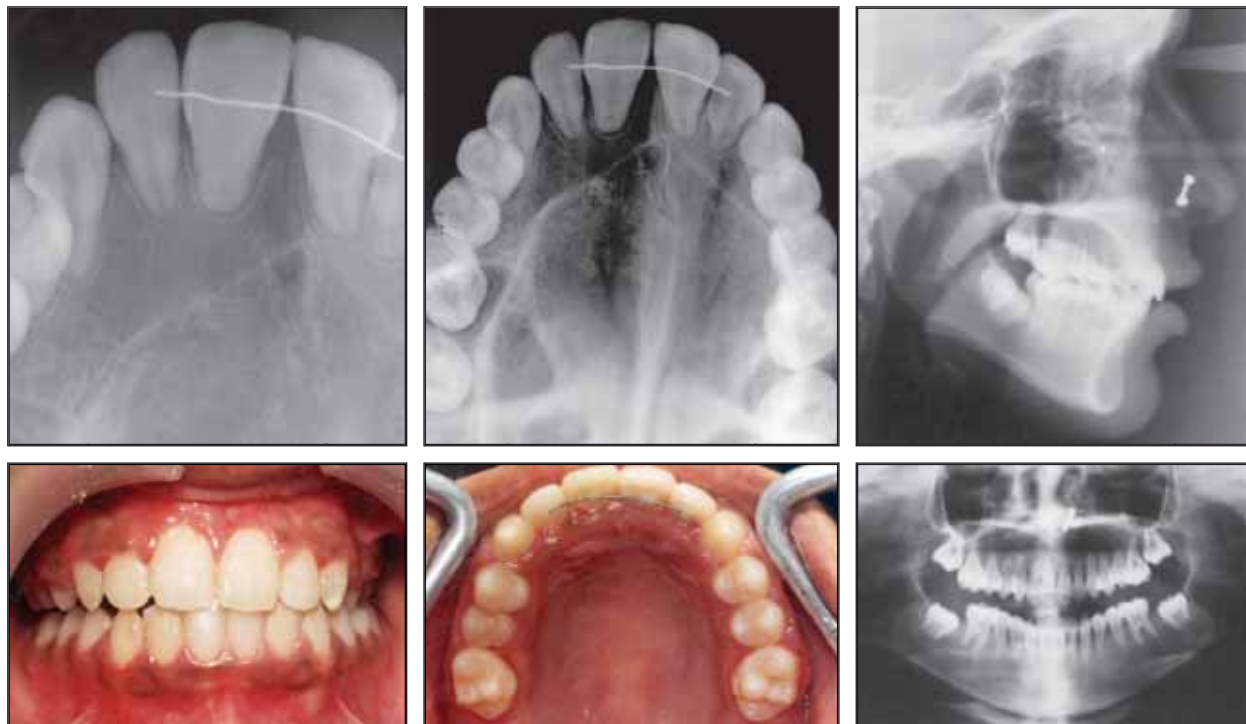
**Fig. 5** Button moved to labial side of impacted incisor, with overlay wire inserted for alignment.



**Fig. 6** Step-up bends and labial root torque placed in full-size archwire, with plastic sleeve added to prevent impingement on frenum.

normal root development can continue. Proper orthodontic alignment will avoid perforation of the cortical plate.

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**Fig. 7 Patient after 19 months of treatment.**

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