Surgical repositioning of the impacted immature maxillary central incisor

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Surgical repositioning is a treatment option for an impacted tooth with root dilaceration in an inverted position. In this case report, surgical repositioning of an abnormally impacted and labially dilacerated maxillary right central incisor is described. The impacted and dilacerated maxillary incisor was surgically repositioned in the early root development period and erupted into proper position with normal root development during a 2-year follow-up period. (Quintessence Int 2011;42:25–28)

**Key words:** impacted tooth, open apex, repositioning

Clinicians infrequently encounter impacted maxillary incisors. The incidence of maxillary incisor impaction ranges from 0.06% to 0.2%.1 Common causes of impaction appear to be the presence of odontoma, supernumerary teeth, blocked eruption path by apical lesions of primary teeth, or cyst or space loss followed by disturbances in the eruption path of incisors related to crowding. Other causes are crown or root malformation of permanent incisors due to trauma from primary predecessors.1 Surgical repositioning is a reasonable treatment in cases of impacted or dilacerated teeth, and it offers one of the fastest and most economic ways to replace impacted teeth.2,3

**CASE REPORT**

A healthy 7-year-old boy was referred because of the delayed eruption of the maxillary right central incisor. He did not have any other dental or traumatic history. The oral and radiologic examination revealed an unerupted maxillary right incisor with an inverted position and a wide open apex (Fig 1). Cone beam computed tomography scans showed that the root apex met the palatal cortical bone and that the root apex started to dilacerate (Fig 2).

Under local anesthesia, a mucoperiosteal flap was raised; the maxillary right central incisor was extracted atraumatically and immediately repositioned upright without curetting the socket. The repositioned tooth was immobilized by a figure-eight suture for 1 week (Fig 3).

Six months postoperatively, the repositioned tooth was partially erupted and exhibited normal lamina dura in radiographs. Compared to the adjacent teeth, the root apex was incompletely formed with a lacerated open apex. Two years after the operation, the maxillary right central incisor was fully erupted with normal lamina dura. The root had grown to form a normal root apex, but the existing pulp obliteration was inevitable (Figs 4 and 5).

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Fig 1  Initial intraoral (a) photograph and (b) panoramic radiograph. Note that the impacted maxillary right central incisor was inverted and that there was midline deviation due to delayed eruption.

Fig 2  Cone beam computed tomography scans with three-dimensional reconstruction images prior to treatment. (a and b) Inverted maxillary right central incisor. (c) Slightly dilacerated root apex. OnDemand3D (Cybermed) software provided sophisticated 3D images.

Fig 3  Surgical repositioning of the maxillary right central incisor. (a) The impacted incisor was revealed. (b) The incisor was repositioned to normal position, and a figure-eight suture provided immobilization.
Fig 4  Periodic radiographic examination. (a and b) Panoramic and periapical views 6 months after surgical repositioning. The white arrow indicates the lacerated root apex. (c and d) Panoramic and periapical views 2 years after surgical repositioning. The black arrow indicates a normally developed root. Pulp canal obliteration was evident.

Fig 5  Periodic clinical examination. (a) Intraoral photograph 6 months after surgical repositioning. Note the partially erupted maxillary incisor. (b) Intraoral photograph 2 years after surgical repositioning. Fully erupted and slightly labialized maxillary incisor. The maxillary incisors are in a typical ugly duckling stage.
DISCUSSION

There are four treatment options for impacted teeth: observation, interceptive treatment, repositioning, and extraction. When the interceptive treatment fails to improve the tooth’s position, repositioning is an alternative surgical/orthodontic treatment. Extraction is indicated when it is impossible to reposition the impacted tooth.4

Surgical repositioning is commonly used to treat intruded teeth.5 If eruption is delayed due to impaction or root dilaceration, surgical repositioning can be an option with or without orthodontic treatment.6 The advantage of this method is that patients can use their own teeth. It is inexpensive, and a quick recovery of the patient’s appearance can be expected.2 The long-standing loss of a central incisor can be a setback to a patient’s social life, which may lead to psychologic problems. From that perspective, immediate surgical repositioning is an excellent treatment option. The inevitable complication of surgical repositioning is pulp obliteration; other complications such as pulp vitality loss, apical closure, decreased or suspended root growth, root deformation, root resorption, or ankylosis may also occur.1,2,7

Various factors affect the success of surgical repositioning. It is essential that the procedure is atraumatic and aseptic. The vitality of the periodontal ligament cells is the most important. It is also important to provide enough blood supply with the proper combination of the recipient area and donor root.2,8 The stage of root development plays an important role in pulp regeneration and natural root growth, so a better prognosis is expected at an early stage of root formation.8

Success criteria of auto-replantation include tooth fixation in its socket without discomfort, satisfactory chewing without discomfort, immobility, no pathologic conditions, and normal lamina dura on radiographs.7

Because ordinary orthodontic movement may cause alveolar bone penetration and prevent root growth, surgical repositioning was selected. After treatment, a periodic recall check was performed. The patient was highly satisfied with the short treatment time, rapid tooth healing, and economic merit. Unfavorable root development had been observed in the earlier follow-up period, but in the later period, normal growth was noticed despite the pulpal obliteration.

CONCLUSION

Early detection of impacted teeth is very important, because it is easier to predict the eruption path and root development. Surgical repositioning can be an ideal treatment because clinicians can guide normal tooth development and provide fast and economic benefits to the patient.

REFERENCES