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By piezoelectric-assisted surgery, an ankylosis tooth is no more contraindication for orthodontic treatment—a case report

KEYWORDS

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surgery;
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Orthodontics

Ankylosis is a common complication while the tooth experienced avulsion or luxation in a serious accident, and leads to infra-occlusion appearance.¹ This condition causes not only esthetic but also functional disorders and cannot be treated by orthodontic force. Extraction or prosthodontic method could be the next option. Piezoelectric assisted surgery has already been well discussed in many fields and replacing the usage of traditional rotary instrument.^{2,3} When combined with orthodontic treatment, it is an effective way to reposition the ankylosed tooth into an ideal alignment result instead of extraction or prosthetic treatment.^{4,5}

A 53-year-old female came to orthodontic department of Wanfang hospital due to protrusion of upper right central incisor. After the clinical examination, she was diagnosed as skeletal class II relationship with low mandibular plane angle and dental canine class II relationship with occlusal plane canting (Fig. 1A). No dental alveolar trauma history was mentioned by the patient. In the first five months, the upper right central incisor had no response to the orthodontic forces. Instead, the right upper lateral incisor and canine slightly moved to the buccal side and became protruded (Fig. 1B). In the further evaluation, the right upper central

incisor reacted a high-frequency metallic sound, and was confirmed as an ankylosed tooth. Thus, single tooth osteotomy assisted by piezoelectric device was recommended and the surgical spaces were created before the surgery (Fig. 1C1). For minimalizing the gingiva recession, the osteotomy was done under the manner of vertical incision subperiosteal tunnel access (VISTA) through the labial frenum. To reposition the tooth into ideal horizontal level, the tooth-alveolar bone block was separated from the neighboring bone completely with osteotomy through the interdental septum. Furthermore, additional bone reduction was done during the osteotomy on both mesial and distal sides to eliminate interferences and relocate the tooth-alveolar bone block more palatally. The tooth-alveolar bone block was fixed and moved with the orthodontic wire during the healing phase (Fig. 1C2). With the precise cutting, no bone grafting material was applied. The orthodontic treatment was finished by the straight wire system after the surgery, obtaining dental canine class I relationship, optimal leveling, alignment, overbite and overjet relationship, and the original skeletal class II relationship (Fig. 1D).

In this case, piezoelectric device enables us to accomplish the single-tooth osteotomy of ankylosed tooth in the anterior maxilla under the following advantages: 1) selective cutting, enabling the surgeon away from the undesirable injuries to the palatal flap and assuring the best potential of vascularization, 2) precise cutting, allowing the surgeon to carry out the best results in limited space with minimal soft tissue damage and also affording the better healing condition to the injured bone tissue. Based on these benefits, piezoelectric device is an optimal equipment to fulfill our expectation of the single-tooth osteotomy. More importantly, after the surgery, the repositioned tooth-alveolar bone block could synchronize the orthodontic forces during the healing progress. Eventually, tooth ankylosis is no longer a contraindication for restoring dental esthetics and functions by orthodontic therapy.

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Figure 1 Clinical photographs of the patient. (A) Initial dental condition. (B) The right upper central incisor had no response to the orthodontic forces and caused the buccal movement and protrusion of right upper lateral incisor and canine. (C1) The surgical spaces have been created before the surgery. (C2) One month after the osteotomy. The wound was under good healing. The position of the tooth segment was adjusted with orthodontic wire. (D) Orthodontic treatment outcomes. Only minimal gingival recession was noted at tooth 11 mesial and distal papillae.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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