Asymmetric extractions in a patient with a hopeless maxillary central incisor, followed by treatment with mini-implant anchorage

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Premolar extraction is 1 option for treatment of patients with malocclusion and severe crowding or protrusion. When the patient has missing or hopeless teeth other than premolars, it is possible to consider removal of those teeth to use the space to decrease crowding. A 15-year-old girl sought treatment for severe crowding. She had already lost her maxillary right first premolar as a result of caries 1 year previously and had a hopeless maxillary right central incisor. Her mandibular left first molar still caused discomfort even after endodontic treatment. Extractions of the maxillary right central incisor and mandibular right first premolar and left first molar were chosen to resolve the occlusion problems. Orthodontic mini-implants were placed to translocate the maxillary left central incisor across the midpalatal suture to use the space in the maxillary right quadrant to relieve the crowding. Although a different extraction option was used in each quadrant, the final occlusion was acceptable. After debonding, porcelain crowns were placed on the anterior teeth to improve esthetics. The treatment result remained stable after 2 years of retention. (Am J Orthod Dentofacial Orthop 2018;153:716-29)

Orthodontic patients have missing teeth for a variety of reasons, including congenital absence, severe caries, periodontal disease, or trauma. The most frequently extracted teeth in orthodontic treatment are premolars.[1] When a patient with malocclusion has missing or hopeless teeth other than the premolars and extractions are needed to treat the issue, the orthodontist can consider using the space of the aforementioned teeth rather than extracting the premolars. Since the numbers of adult orthodontic patients are increasing, the number of patients with these circumstances has increased as well.[1,2] Asymmetric extractions produce a different amount of extraction space in each quadrant. As a result, additional anchorage sources are frequently required to manage this asymmetric situation.

Orthodontic mini-implants (OMIs) have been used as temporary anchorage units for various forms of tooth movement.[3-9] OMIs have the advantage of easy placement and removal, minimal anatomic limitations, low costs, and lack of necessity for patient compliance.[10,11] The placement of OMIs allows the dental practitioner freedom in planning tooth movement.

If 2 teeth in the same quadrant are missing and extraction treatment is recommended, the translocation of the central incisor on the opposite side of the midline could be a viable option to treat the patient's malocclusion. A previous animal study using beagle dogs showed that, in young dogs, the suture was distorted in the direction of the tooth movement, whereas the central incisor in old dogs could be moved without any restrictions but exhibited greater root resorption.[12] Some case reports have shown that the movement of the maxillary central incisor to the contralateral side was successful in children (8-9 years),[13-15] adolescents,[16] and young adults.[17] All of these case reports demonstrated successful outcomes and no radiographic root resorption.

This case report demonstrates that OMIs are a convenient tool to use as anchorage and are useful in the treatment of asymmetric extraction cases. The treatment result showed that a central incisor can be moved across the midpalatal suture without complications, and asymmetric extraction spaces were closed successfully.

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Fig 1. Pretreatment facial and intraoral photographs.

DIAGNOSIS AND ETIOLOGY

The patient was a girl, aged 15 years 11 months, who was particularly concerned about anterior dental crowding (Fig 1). Her medical history was unremarkable other than dental trauma that occurred 2 years previously as a result of a fall. Her maxillary right central incisor was avulsed, and the maxillary right lateral incisor had a severe impact. After relocation of the central incisor, the patient received temporary fixation treatment using a wire and composite resin, followed by endodontic therapy 1 week later. Neither the patient nor her mother could remember why no treatment was provided on the lateral incisor or the prognosis explanation from the dentist. The patient no longer reported discomfort in the region.

In the panoramic radiograph (Fig 2), the maxillary right central incisor exhibited progressive root resorption, and the maxillary right lateral incisor had a clear fracture line below the cementoenamel junction. The maxillary right first molar had short roots, but no symptoms were reported. The mandibular left first molar had endodontic therapy 1 year previously because of severe caries but still exhibited a slight radiolucency in the apical region. The patient frequently felt pain and discomfort in this area during mastication. As a result of these lingering symptoms, prosthetic crown restoration of the endodontically treated tooth was delayed.

During the clinical examination (Figs 1 and 3), moderate crowding was noted in the mandibular arch (arch length discrepancy, 4.5 mm), and discoloration was observed on the maxillary right central and lateral incisors. The maxillary right first premolar was extracted 1 year previously due to severe caries. As a result of the extraction, the maxillary dental midline deviated to the right side, and the maxillary arch shape was asymmetric in the occlusal view. Over time, the maxillary right molars drifted anteriorly to fill the extraction space. There was an edge-to-edge occlusal scheme with poor incisal contact in the anterior region. The mandibular dental midline was deviated slightly to the left. The left molar area had a mild Class III relationship, and the right side exhibited a Class II relationship. The maxillary left first premolar had a discolored resin restoration but did not show any symptoms.