

# Surgical and orthodontic management of maxillary canine-lateral incisor transpositions

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Transposition of the maxillary canine and the lateral incisor is a complex dental anomaly to treat. The difficulty increases if the treatment aims to correct the transposition. These case reports describe 2 patients with transposition of the maxillary lateral incisor and canine. The first case involves bilateral incomplete transpositions, and the second is a complete transposition. The radiographic appearance of the canine was similar in the 2 patients. However, the treatments were distinct because of the 3-dimensional positions of the teeth. The first case involved palatally placed lateral incisor roots. To prevent resorption of the lateral incisors, the canines were moved into position buccally. In the second case, the lateral incisor root had a buccal position, and the canine crown was tractioned palatally. The position of the lateral incisor root was critical when electing the correct treatment and mechanics for each patient. (*Am J Orthod Dentofacial Orthop* 2016;150:876-85)

**T**ooth transposition is the positional interchange of 2 adjacent teeth or the development or eruption of a tooth in a position occupied normally by a nonadjacent tooth.<sup>1</sup> Although evidence has been found of transpositions in prehistoric skulls, the cause of a transposition is still unknown.<sup>2</sup> Genetic inheritance, previous trauma, alteration in the position of the dental lamina, or retention of the deciduous canine are current etiologic theories.<sup>1,3,4</sup> The incidence of transpositions in the population is low (0.2%–0.38%).<sup>5–7</sup> Most transpositions occur in the maxilla (76%), of which 88% are unilateral.<sup>8</sup> The canine is involved in 90% of transpositions, most commonly with the first premolar (71%) or the maxillary lateral incisor (20%).<sup>6</sup> Transpositions are classified as complete when both teeth have been entirely transposed or incomplete when only the crowns or the roots have interchanged positions.<sup>4,6</sup>

Current diagnosis relies on clinical and radiographic observations. Two-dimensional radiography allows

predictions about the position and amount of resorption; however, cone-beam computer tomography (CBCT) improves visualization of the transposition, resorption, and associated risks.<sup>9</sup>

Because of low prevalence rates, robust trials regarding the most effective treatment and timing of treatment are not available. The following treatment options remain: (1) no treatment, (2) interception involving extraction of the deciduous canines, (3) extraction of 1 transposed tooth if extraction is required for correction of the malocclusion, (4) alignment of the teeth in the transposed position and subsequent restorative treatment for camouflage, and (5) orthodontic correction of the transposed teeth.<sup>10,11</sup>

The 2 cases presented involve canine and lateral incisor transpositions in the maxilla: one was bilateral and incomplete, and the second was a complete transposition as classified in the literature.<sup>6</sup> The differing tooth anatomies of the canine and the lateral incisor make this type of transposition more complex because of esthetic and functional considerations. The treatment option chosen for both patients was orthodontic correction. Although these cases involved the same teeth and both patients opted for the same treatment, the sequences of mechanics were different because of the position of the lateral incisor root in relation to the canine crown. The patients were informed of the associated risks and treatment alternatives.

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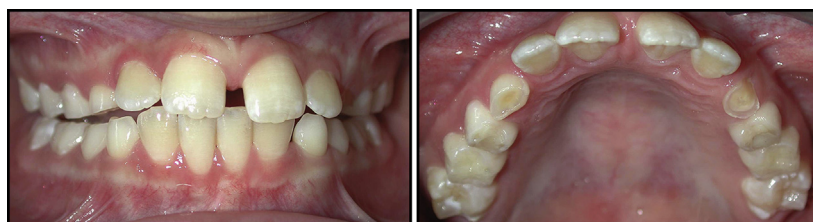
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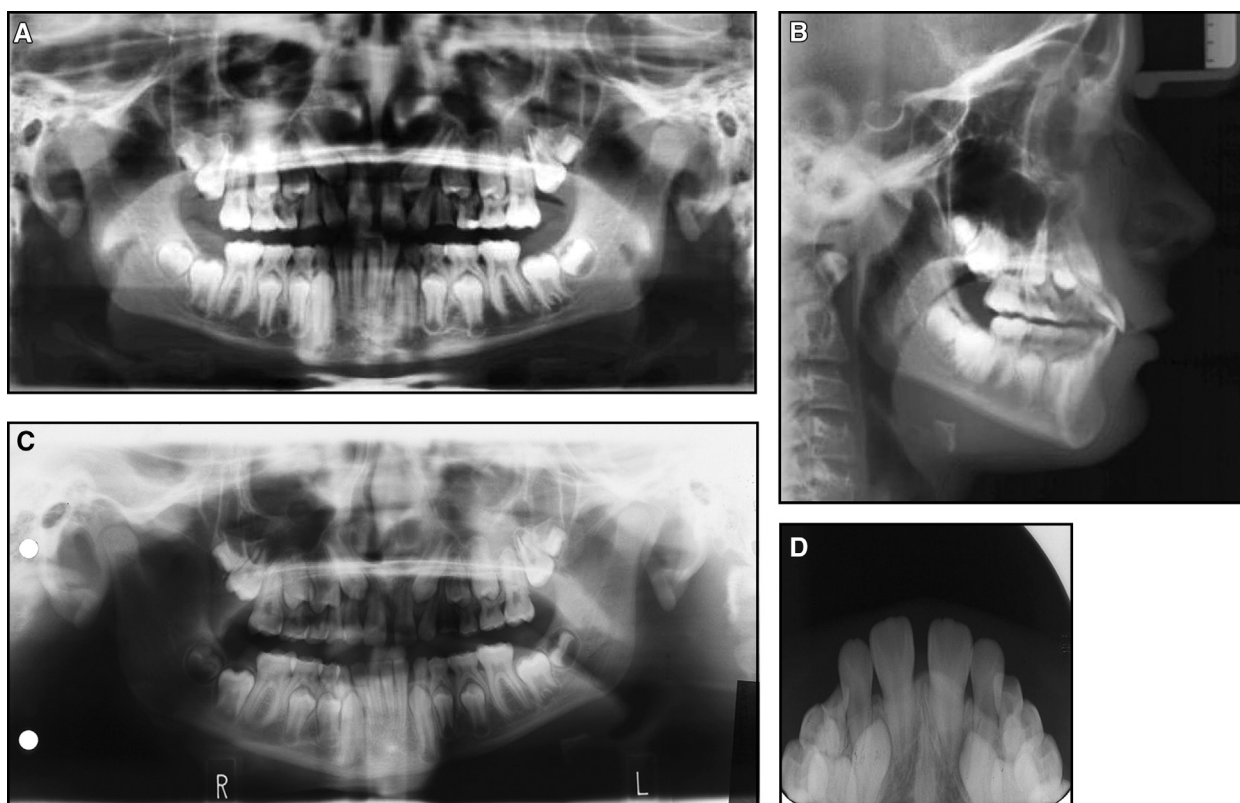
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**Fig 1.** Patient 1: pretreatment intraoral photographs.



**Fig 2.** Patient 1: **A**, pretreatment panoramic radiograph; **B**, pretreatment lateral cephalometric radiograph; **C**, previous panoramic radiograph forwarded from transfer clinic confirming the change in canine position; **D**, maxillary anterior occlusal image from the transfer clinic allowing diagnosis of position.

## PATIENT 1

### Diagnosis and etiology

A 12-year-old boy came for an initial orthodontic assessment. It was noted on palpation that the maxillary left and right canines were buccally positioned between the respective central incisor and lateral incisor. A complete set of orthodontic records was taken. There was no relevant medical history.

Intraoral photos showed a Class I mixed dentition, with delayed exfoliation of posterior deciduous teeth including

the maxillary canines. The maxillary arch was spaced with a midline diastema associated with a low frenal attachment and proclination of the maxillary incisors. The photographs were taken in centric relation, but in occlusion there was a unilateral crossbite caused by a functional shift (Fig 1). The panoramic radiograph confirmed the presence of all teeth but demonstrated generalized delayed eruption of the permanent dentition. The crowns of the canines were transposed with the roots of the lateral incisors. The right side was an incomplete transposition, and the left side was nearing a complete transposition but with

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