



## Correspondence

# Treatment of labially impacted maxillary canine with space deficiency and class III malocclusion: Case report

**KEYWORDS**

Labially impacted maxillary canine;  
Closed traction technique

Impaction of the maxillary canine is occasionally encountered. In this case report, we used surgical exposure and orthodontic closed traction technique to move the impacted right maxillary canine to an appropriate alignment and gained a class I molar relationship with normal overjet and overbite for the patient.

This 13-years-old male patient was referred to our hospital for treatment of impacted right maxillary canine. He had symmetrical facial appearance but a straight lateral profile (Fig. 1A and B). Intraoral examination showed that the right maxillary canine and bilateral maxillary second molars were unerupted. Upper dental midline shifted 2 mm to the right side. There were spaces between teeth from the right maxillary lateral incisor to the right maxillary second premolar, but only 1 mm space left at the right maxillary canine area. Bulging was palpable over the right maxillary anterior vestibular area, corresponding to the right maxillary lateral incisor. Molar relationship was class I on the right side with severe mesial-in rotation of the right upper molar and class III on the left side (Fig. 1C, D and E).

Periapical and panoramic films showed a high-position impacted right maxillary canine, with the coronal portion apical to the lateral incisor and a well-defined radiolucent lesion embracing the crown of the impacted canine. No obvious evidence of root resorption of the right lateral incisor was found, and the root formation of the premolars were not yet completed (Fig. 1F and G). Cephalometric

analysis revealed class III skeletal pattern with slightly recessive maxilla and normal mandibular plane angle. Upper and lower incisors were too upright with increased interincisal angle.

The treatment alternatives were either extraction of the impacted canine and creation of a space for future prosthesis<sup>1,2</sup> or removal of the impacted canine together with the three first premolars (the left maxillary, left mandibular, and right mandibular premolars) for midline and Class III correction. Because the patient already had a straight profile with retrusive lips, extraction treatment did not seem appropriate, and the parents did not want him to have any prosthesis in the future. Therefore, our final treatment was to preserve the impacted right maxillary canine.

The treatment plan was to create a space followed by surgical exposure and forced eruption of the impacted canine<sup>2–4</sup> and correction of upper dental midline. Thus, the final goal was to obtain a class I molar relationship with normal overjet and overbite for the patient.

After full mouth fixed appliance placement, archwires were progressively changed from 0.016" NiTi wire, 0.016" stainless steel wire, and 0.016" × 0.022" TMA wire to 0.016" × 0.022" stainless steel wire. Nance appliance was placed after first molar had derotated. The impacted canine was surgically exposed 9 months after initial treatment, button was bonded and pure distal force was directed to the lever arm from the first molar (Fig. 1H). Two

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**Figure 1** Clinical photographs and radiographs of our patient before and after treatment. (A) Initial extraoral frontal view. (B) Initial extraoral lateral view. (C, D and E) Initial intraoral right buccal view, upper occlusal view, and left buccal view. (F) Initial periapical radiograph of the impacted right maxillary canine. (G) Initial panoramic radiograph. (H) Surgical exposure and pure distal force with power arm. (I) Distalization and extrusion force vectors for canine traction. (J) Extrusive force with lever arm. (K) Accessory 0.016" stainless steel wire with box loop for canine derotation. (L and M) Post-treatment extraoral frontal view and lateral view. (N, O, and P) Post-treatment intraoral right buccal view, upper occlusal view, and left buccal view. (Q) Post-treatment panoramic radiograph. (R and S) Three-year follow-up extraoral frontal view and lateral view. (T, U, and V) Three-year follow-up intraoral right buccal view, upper occlusal view, and left buccal view.

months later, after the exposed canine had moved away from the lateral incisor, two force vectors were added for extrusion and distalization (Fig. 1I, J and K). It took another 8 months to bring the impacted right maxillary canine into an appropriate alignment. The total treatment time was 24 months (Fig. 1L, M, N, O, P, and Q).

Before canine traction, space creation should be cautiously done not to endanger the lateral incisor to result in root resorption.<sup>4</sup> Some space was gained from distalization of posterior teeth, and after the impacted canine had

moved away from the lateral incisor, further space was regained by anterior proclination. An extrusive lever arm was used to extrude the impacted canine, and this helped to eliminate direct force from the main archwire and cause anterior canting.

Though the periodontal health and esthetics for forced eruption of impacted canine may be better with uncovered technique,<sup>5</sup> closed traction technique applied in this case showed adequate zone of attached gingiva with good post-treatment stability (Fig. 1R, S, T, U, and V).

## Declaration of Competing Interest

The authors declare no conflicts of interest relevant to this article.

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Tai-Chang Chen  
*Department of Orthodontics, Far Eastern Memorial Hospital, New Taipei City, Taiwan*  
*Department of Orthodontics, National Taiwan University Hospital, Taipei, Taiwan*

Chun-Pin Chiang  
*Department of Dentistry, Far Eastern Memorial Hospital, New Taipei City, Taiwan*  
*Department of Dentistry, National Taiwan University Hospital, College of Medicine, National Taiwan University, Taipei, Taiwan*  
*School of Dentistry, National Taiwan University, Taipei, Taiwan*

Ming-Shu Lee  
*Department of Dentistry, National Taiwan University Hospital, College of Medicine, National Taiwan University, Taipei, Taiwan*  
*School of Dentistry, National Taiwan University, Taipei, Taiwan*  
*Department of Prosthodontics, National Taiwan University Hospital, College of Medicine, National Taiwan University, Taipei, Taiwan*

Chih-Liang Ho (Julian) \*  
*Department of Orthodontics, Far Eastern Memorial Hospital, New Taipei City, Taiwan*  
*Department of Orthodontics, National Taiwan University Hospital, Taipei, Taiwan*

\*Corresponding author. Department of Orthodontics, Far Eastern Memorial Hospital, No. 21, Section 2, Nanya South Road, Banciao District, New Taipei City, 220, Taiwan.  
 E-mail address: [julianho600712@yahoo.com.tw](mailto:julianho600712@yahoo.com.tw) (C.-L. Ho)

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