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# A multidisciplinary approach of impacted and transposed maxillary canine: A case report

Dimas Iman, Ida B. Narmada, Muchammad R. Yusuf and Ratna Putri

## Abstract

The impacted and transposed teeth cause consequences in tooth eruption and movement, resulting in aesthetic and functional outcomes. A proper treatment plan with treatment duration and cost consideration is necessary to treat them. This study reported treatment for a 23-year-old male patient with impacted and transposed canine in maxilla using a multidisciplinary method between orthodontic and conservation. According to the anamnesis of the patient, his upper arch midline contained an extra tooth when he was a child. With the consideration of the duration and cost of treatment, the preferable and manageable treatment fell into the correction using a fixed orthodontic appliance with careful mechanics and enameloplasty to achieve the aesthetic and functional goal.

## Keywords:

Impacted, multidisciplinary, transposition

## Introduction

According to the clinical and radiographic assessment, impacted teeth are those with delayed eruption time or that are not expected to erupt completely.<sup>[1,2]</sup> Impaction can occur in any teeth; however, the most affected are the lower third molars (39.2–45.7%), followed by permanent maxillary canines (1–1.1%). Meanwhile, the impaction of the maxillary central incisor tends to be low (0.06–0.2%).<sup>[3-5]</sup>

Either obstructive or traumatic causes can be the sources of this prevalence.<sup>[6]</sup> The most common obstruction in the anterior maxilla is the presence of a minimum midline supernumerary tooth, which occurs before the eruption of permanent teeth. That condition leads to harm to the root-forming cells of the unerupted permanent tooth germ and changes the direction of the tooth during the alveolar process.<sup>[7]</sup>

Dental transposition is a rare dental phenomenon. A study reveals the prevalence of transposition to be 0.33%.<sup>[8]</sup> The transposition of teeth is defined as an interchange of position from two teeth on the same side of the dental arch.<sup>[1,9]</sup> This case occurs as the result of trauma to the deciduous dentition, inducing a drift to the permanent tooth bud.<sup>[10]</sup> Furthermore, a transposition between the maxillary canine with the first premolar (Mx.C.P1) is the most frequently found, followed by the transposition of the maxillary lateral incisor with the canine (Mx.C.I2).<sup>[8]</sup>

When developing an orthodontic treatment plan for impacted and transposed teeth, several factors should be considered.<sup>[9]</sup> Multidisciplinary treatment usually is required in treating this case.<sup>[11,12]</sup> A multidisciplinary approach increases the horizons of treatment to meet the expectations of the patient.<sup>[13]</sup>

A late-diagnosed orthodontic planning in a horizontally inclined tooth, in a severe ectopic position, or in complete or partial

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Department of  
Orthodontic, Faculty  
of Dental Medicine,  
University of Airlangga,  
Surabaya, Indonesia

### Address for correspondence:

Dr. Ida B. Narmada,  
Department of  
Orthodontic, Faculty  
of Dental Medicine,  
University of Airlangga,  
Surabaya, Indonesia.  
E-mail: dr\_narmada@  
yahoo.com

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Figure 1: Pretreatment facial and intraoral images



Figure 2: Pretreatment panoramic radiograph

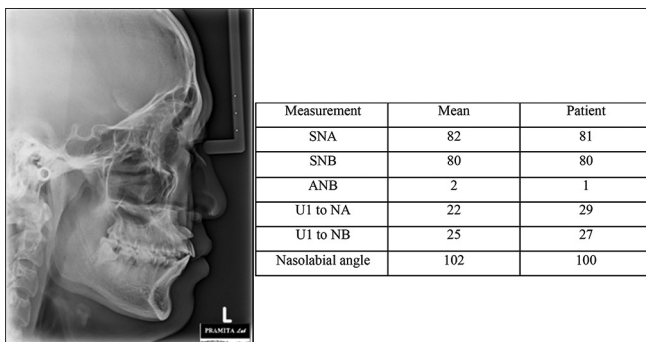


Figure 3: Pretreatment cephalometric radiograph and measurements

tooth transposition can influence the decision to extract impacted or transposed teeth along with the order of tooth position correction.<sup>[3]</sup> When the roots are completely transposed, the teeth are left in the transposed order. Indeed, this solution has a minor aesthetic disadvantage;

however, it is significantly easier, faster, and less likely to fail than attempting to correct the tooth order.<sup>[14]</sup>

This paper provided the report of treatment for a patient with impacted and transposed maxillary canine with a multidisciplinary approach from orthodontic and conservation.

### Case Report

A 23-year-old male patient came to the Airlangga University Dental Hospital. His primary complaint was related to the crowded teeth and there was a tooth that erupted far from other teeth, which made him unconfident when smiling. Information about the supernumerary tooth in the upper arch midline was obtained from the patient's anamnesis. Meanwhile, the patient's medical history showed no problems or no systematic diseases were found, which might interfere with the orthodontic treatment.

A clinical examination revealed that the patient had a permanent dentition. The molar relationship was class I Angle, overjet, and overbite were 1 mm. Tooth #11 was missing and tooth #13 was in present far from the arch, near the buccal fold. Tooth #53 was retained on the right maxillary arch. The position of teeth #12 and #13 was transposed. The facial analysis did not reveal any evident asymmetries and the facial profile was straight [Figure 1].

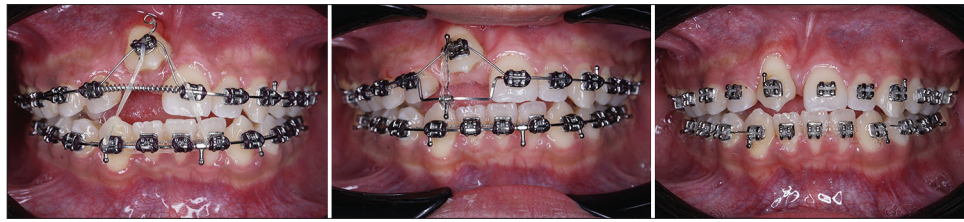


Figure 4: Piggyback technique at teeth #13, tooth #13 extrude progress using elastomeric chains



Figure 5: #13 Height measurement

Furthermore, the panoramic radiograph and lateral cephalogram disclosed that teeth #13 and #11 were impacted, whereas transposition between teeth #13 and #12, and tooth #42 was missing [Figure 2].

Additionally, the cephalometric radiograph and analysis discovered a Class I skeletal pattern. The upper incisors were proclined, whereas the lower ones were still within the normal range [Figure 3].

### Treatment plan

The following treatment alternatives were considered.

1. Opening space for teeth #11 and #13, #12 would be moved to the mesial to correct the transposed position while retracting tooth #13 occlusally, and tooth #11 would be retracted occlusally after the transposition was corrected.
2. Opening space for tooth #13 and then retracting it occlusally, teeth #12 and #13 would remain transposed, but tooth #13 would be reshaped to achieve the aesthetic goal, and odontectomy of tooth #11 would be performed after finishing.

Ideally, treatment objectives would include the full resolution of malocclusion with correct positioning of the impacted and transposed teeth in the dental arch. However, based on the review of tooth #11 inclination and tooth #13 position, which were completely transposed with tooth #12, this would have entailed a long treatment duration and high cost for the patient. Meanwhile, an aesthetic consideration regarding the facial profile and lip prominence was also considered if tooth #11 was brought to the right position.

After discussing and weighing all the benefits and drawbacks with the patient, the preferred treatment plan was treatment number (2). After sufficient space

was available, tooth #13 would retract occlusally. The patient will be referred to the conservation department to have tooth #13 reshaped so it can be similar to tooth #11 so that aesthetic goals can be achieved. Tooth #11 would not be retracted orthodontically but would be removed by odontectomy when the orthodontic treatment is finished.

### Treatment progress

Metal brackets MBT prescription slot 0.22" were chosen to be placed to achieve great tip and torque. Buccal tubes with slot 0.22" were bonded at the molars.

For the alignment and leveling step, round superelastic nickel-titanium archwires were placed in the maxilla and mandible in the following sequence: 0.012-in, 0.014-in, 0.016-in, and 0.016-in × 0.022-in.

Space opening for tooth #13 began with 0.016-in × 0.022-in stainless steel rectangular archwire was performed, followed by 0.017-in × 0.025-in on the maxilla, and then, an open coil spring was placed between teeth #21 and #12. After sufficient space had been obtained, the bracket was placed on tooth #13.

After that, the Piggyback technique was utilized to extrude tooth #13 using round nickel-titanium wire 0.012-in as the secondary wire and 0.017-in × 0.025-in stainless steel rectangular arch wire as the main wire. Then, an additional hook was placed on the mandibular archwire between teeth #31 and #32. An intermaxillary elastic with a diameter of 4.8 mm, 4.5 oz was used by the patient as instructed from teeth #13 to #32 and tooth #43 to help the extrusion and manage the overbite.

The space that had been opened in the maxilla was then maintained by bending the stainless steel wire between teeth #21 and #12. An additional hook was placed on that bent area. Elastomeric chains, which were attached to the hook, helped the progress to extrude #13 [Figure 4].

Enameloplasty was performed once tooth #13 reached the occlusal plane. Measurement was taken to make tooth #13 similar to tooth #21 [Figure 5].

After enameloplasty was finished, re-leveling was implemented on the maxilla using a round super

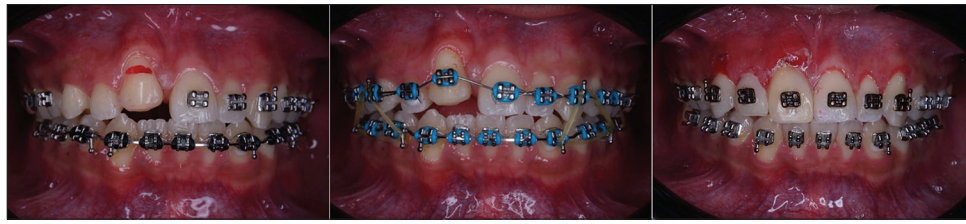


Figure 6: Re-leveling and intermaxillary elastic



Figure 7: Posttreatment facial and intraoral images

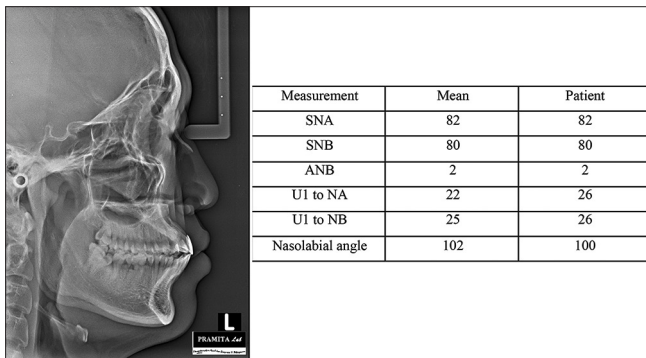


Figure 8: Posttreatment cephalometric radiograph and measurements

elastic nickel–titanium archwire 0.016-in, followed by 0.016-in × 0.022-in nickel–titanium archwire. Intermassillary elastic with diameter 4.8 mm, 4.5 oz was instructed to the patient to use at posterior left from teeth #23, #33, and #35 and right teeth #13, #43, and #45 and maintain the bite [Figure 6].

The finishing and detailing were completed using 0.016-in × 0.022-in, 0.017-in × 0.025-in followed by 0.019-in × 0.025-in stainless steel rectangular archwire.

### Treatment Result

After 21 months of active orthodontic treatment, the result of the analysis on the patient exhibited that the main treatment objectives were achieved. The dental corrections were also obtained and his facial features were significantly improved [Figure 7]. The cephalometric analysis displayed enhanced SNA (82°), ANB (2°) which defined as Class I skeletal pattern, and upper incisor inclination [Figures 8 and 9]. Furthermore, the upper right canine had been reshaped similarly into the upper left central incisor. Molars were in Class I angle relationship on both sides with the normal overjet. Lastly, the functional harmony was excellent for occlusion.



Figure 9: Posttreatment panoramic radiograph

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

### References

1. Deepthi A, Rayen R., Jeevarathan J, Muthu MS, Rathna PV. Management of an impacted and transposed maxillary canine. *J Indian Soc Pedodont Prev Dent* 2010;28:38-41.
2. Syahdinda MR, Nugraha AP, Triwardhani A. Management of impacted maxillary canine with surgical exposure and alignment by orthodontic treatment. *Dental Journal* 2022;55:235-9.
3. Gebert TJ, Palma VC, Borges AH, Volpato LE. Dental transposition of canine and lateral incisor and impacted central incisor treatment: A case report. *Dent Press J Orthod* 2014;19:106-12.
4. Khera AK, Rohilla A, Tandon P, Singh GP. Orthodontic management of impacted central incisor: A clinical challenge. *J Indian Orthodont Soc* 2017;51:46-50.
5. Nurul HCS, Santosh KMP, Arthi B. Prevalence of impacted teeth among dental patients-An institutional study. *Eur J Mol Clin Med* 2020;7:1943-51.
6. Sitasari PI, Merrystia N, Narmada IB. Management of a complete 180° rotation of bilateral maxillary canines. *Dent J* 2021;54:174-80.
7. Chaushu S, Becker T, Becker A. Impacted central incisors: factors affecting prognosis and treatment duration. *Am J Orthod Dentofacial Orthop* 2015;147:355-62.
8. Papadopoulos MA, Chatzoudi M, Kaklamanos EG. Prevalence of tooth transposition: A meta-analysis. *Angle Orthod* 2010;80:275-85.
9. Nishimura K, Nakao K, Aoki T, Fuyamada M, Saito, K, Goto S. Orthodontic correction of a transposed maxillary canine and first premolar in the permanent dentition. *Am J Orthod Dentofacial Orthop* 2012;142:524-33.
10. Ciarlantini R, Melsen, B. Maxillary tooth transposition: Correct or accept? *Am J Orthod Dentofacial Orthop* 2007;132:385-94.
11. Mardiaty E, Komara I, Astuti IA. orthodontic treatment and open window surgery of impacted maxillary first permanent incisor. *JKG UNPAD* 2021;33:254-61.
12. Gunardi OJ, Danudiningrat CP, Rizqiawan A, Mulyawan I, Amir MS, Kamadjaja DB, *et al.* Decision-making criteria of odontectomy or surgical exposure in impacted maxillary canine based on treatment difficulty index modification. *Eur J Dent* 2022;16:796-802.
13. Kalia A, Mirdehghan N, Khandekar S, Patil W. Multi-disciplinary approach for enhancing orthodontic esthetics—case report. *Clin Cosmetic Investig Dent* 2015;7:83-9.
14. Halazonetis DJ. Horizontally impacted maxillary premolar and bilateral canine transposition. *Am J Orthod Dentofacial Orthop* 2009;135:380-38.