

Orthodontic Correction of a Transposed Maxillary Canine and Lateral Incisor: A Rare Case Report

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Abstract

Transposition of tooth presents a great challenge in the treatment of a malocclusion. A dental transposition is an uncommon anomaly affecting 0.4% of the population, yet the treatment difficulties and challenges make this anomaly a subject of orthodontic interest and a source of clinical interest. This case report shows the unilateral transposition of a maxillary canine with a lateral incisor that was treated by orthodontically reversing the transposed tooth position.

Keywords: Tooth Transposition; Maxillary Canine; Deciduous Canine

Introduction

Transposition is defined as an unusual type of ectopic eruption where a permanent tooth develops in the position normally occupied by another permanent tooth [1]. In other words, dental transposition is a developmental alteration resulting in a deviation in tooth position, clinically identified as the interchange of 2 adjacent teeth, that alters the natural order of the dental arch [2]. It is a rare occurrence that affects less than 1% of the population. Transposition affects the maxillary dentition (68.5% - 76%) more frequently than the mandibular dentition [3].

The canine is one of the most commonly involved teeth in the transposition phenomenon, changing its eruptive place with the lateral incisor or the first premolar in most cases. Canine transposition has a maxillary predilection and is generally associated with other anomalies, such as agenesis (40%), deciduous canine retention (50%), and peg-shaped maxillary lateral incisors (25%) [4].

Many articles have been published on the transposition of the maxillary canine and lateral incisor. In 1995, Peck and Peck 2 stated that 20% of the transpositions in the maxillary arch involve the canine and the lateral incisor, a type of transposition which was first reported in 1817 by Miel [5]. A review of the pertinent literature shows that the cause of transposition remain unclear, although early loss or retention of primary canine, the transposition of the analog of the teeth during odontogenesis, migration of a tooth away from its normal path of eruption, and heredity are the factors most often cited [6].

In this article, a case is presented to demonstrate transposition of the maxillary right canine and the right lateral incisor. An ortho-

odontic treatment approach was used to accomplish the desired correction.

Case Report

A 13 - year-old girl was reported to the department of Paedodontics and preventive dentistry, Himachal Institute of Dental Sciences Paonta Sahib with a chief complaint of crowding. The patient was in good general health, and the medical and dental history indicated no contraindications to dental treatment. A clinical and oral examination showed crowding, retained deciduous canine tooth on the right side along with midline shift towards left side. Transposition of the right maxillary canine with right lateral incisor was observed, whereas left maxillary canine was blocked out of the arch in its own position (Figure 1 and 2).



Figure 1 and 2: Preoperative models.

Radiographic examination included OPG and cephalometric analysis which showed normal and complete root development with the exception of transposition of right maxillary canine with lateral incisor and retained deciduous right maxillary canine. Moreover, transposition was complete with both crown and root of the canine mesial to lateral incisor. No permanent tooth was missing (Figure 3-6).

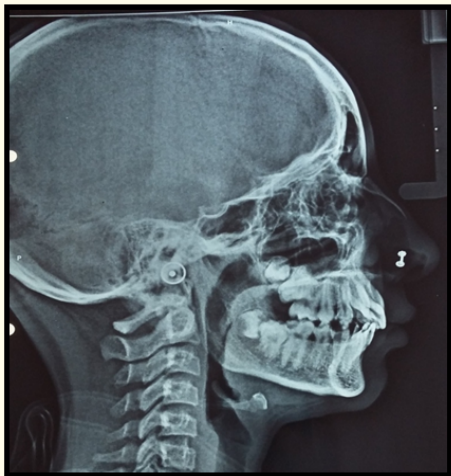


Figure 3 and 4: Transposition between canine and lateral incisor.



Figure 5 and 6

Treatment approach

The treatment planning for this malocclusion involved the following: facial balance, an arch length discrepancy and cephalometric measurements, a midline correction, an esthetic aspect, and correction of the transposition.

Treatment Procedure

After taking all the preclinical records and study models, the treatment starts with extraction of the retained deciduous canine

along with band adaptation and placement of brackets. We planned for initial alignment and leveling first with 0.014 Ni Ti wire. Since transposition was complete with both crown and root of the canine mesial to lateral incisor, placement of bracket and arch wire engagement at this time on lateral incisor would bring the root labially into the root of canine leading to root resorption.

Therefore, lingual button was placed at the palatal surface of lateral incisor so that traction of the lateral incisor can be done palatally with help of elastic chain tied to the loop of trans palatal arch (Figure 7). Initial alignment was done by 0.14 NiTi but lateral incisor and the canine were excluded. Separate alignment was done for canine with 0.16 NiTi. The wire was incorporated from molar tube to canine on the right side. A 90° bend was made mesial to molar tube and again bend was made so that the wire run parallel to occlusion surface of teeth upto the level of the bracket slot of canine (Figure 8). The wire was changed to 16 x 22 and 19 x 25 and 21 x 25 over the time. Afterwards elastic chain was incorporated from canine to molar for distalization of canine. Meanwhile extraction of both first premolars was done for the correction of midline shift and to accommodate left canine in the arch. Elastic chain was incorporated from molar to canine on the right side and from right central incisor to left canine.

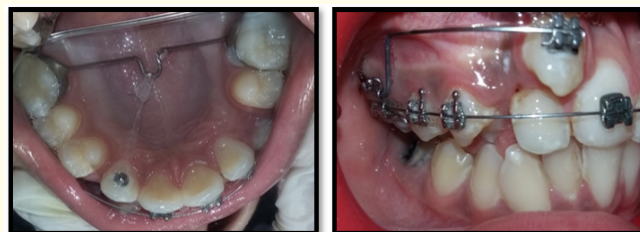


Figure 7 and 8: Lingual button was given for traction of lateral incisor (22) palatally.

Distal movement of canine was apparent after 2 months of follow up period (Figure 9). After almost 10 months the canine was brought into the arch, the lateral incisor was released from traction and canine was distalized into its normal position. The lateral incisor was teased back into the arch form with elastic thread. Brackets were placed and the tooth was engaged with the arch wire. Overlay arch wire was removed and single arch wire 0.016 NiTi followed by 0.016 X 0.022 and 0.019 X 0.025 SS was incorporated after every 3 weeks of follow up. After that remaining space was closed by incorporating elastic chain from molar to molar (Figure 10).

After almost 24 months of active orthodontic treatment, the patient had good esthetic results. Midline was corrected and transposed canine was now in its original position (Figure 11).

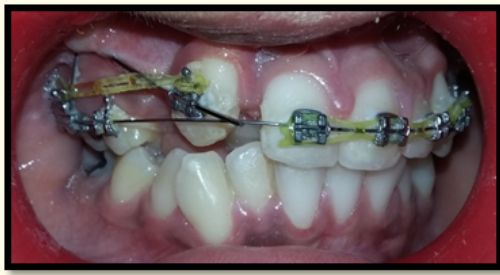


Figure 9: Distal movement of canine was apparent after 2 months follow up appointment.



Figure 10: Elastic chain given to close the residual space.



Figure 11: Post treatment photographs.

Discussion

Tooth transposition is a severe disturbance of tooth eruptive position and their sequence, which involve certain teeth occurring at any of several specific sites in the mouth. Tooth transposition is of several types and their classification depends on the teeth involved [7]. The canine is one of the most commonly involved teeth in the transposition phenomenon, changing its eruptive place with the lateral incisor or the first premolar in most cases. It has been found that in pre eruptive stage of maxillary canine, the tooth bud is located adjacent to the aperture piriformis which is at relatively higher position occupied by pre-erupted premolars. Therefore, it can be the main cause of maxillary canines presenting higher risk of ectopic eruption [8]. The increased occurrence of retained deciduous canine and simultaneously presence of permanent canine transposition creates a cause-effect relationship. Though, it is a matter of speculation that whether the retention of primary tooth is responsible for displacement of its permanent successor

or a changed path of eruption of corresponding successor may lead to the retention of primary tooth [9].

Retained deciduous canines were suggested as a cause for extreme ectopic eruption of the maxillary canines into the incisor, second premolar, or first molar area [10-13]. However, according to Peck, *et al.* [2] a retained deciduous tooth is a consequence of the anomaly, not its cause.

In the present case report patient presented with a challenging case of unilateral transposition of the right lateral incisor and canine. The transposition was complete, with both the crown and the root of the canine mesial to the crown and the root of the lateral incisor. Complete transpositions require complex and often protracted treatment plans with no guarantee of success. Parker suggested that heroic efforts to resolve transpositions can be disappointing. Therefore, careful consideration must be given to the specific circumstances of the patient, including predicted compliance and tolerance of protracted treatment, before embarking on a heroic treatment plan.

The orthodontic correction of complete transposition is complex. The key to success is to treat early, because treatment can be accomplished with fewer possibilities of injuring the surrounding tissue.

Conclusion

In conclusion, canine transposition is considered to be the most common transposition found in human dentition. Early clinical examination of children, before reaching 10 years of age, is recommended to detect developmental anomalies. Once transposition has occurred, careful orthodontic assessment must be carried out to correct the malocclusion in a manner that produces the best esthetic and functional result.

Bibliography

1. Shapira Y and Kuftinec M. "Maxillary canine-lateral incisor transposition-orthodontic management". *American Journal of Orthodontics and Dentofacial Orthopedics* 95 (1989): 439-444.
2. Chatopadhyay A and Srinivas K. "Transposition of teeth and genetic etiology". *The Angle Orthodontist* 66.2 (1998): 147-152.
3. Shapira Y and MM Kuftinec. "Maxillary tooth transpositions: characteristic features and accompanying dental anomalies". *American Journal of Orthodontics and Dentofacial Orthopedics* 119 (2001): 127-134.
4. Wood FL. "Developmental anomaly with associated canine transposition". *British Dental Journal* 104 (1958): 212.
5. Miel EM. "Observation sur un cas tres-rare de transposition de dents". *Journal General de Medecine, de Chirurgie, de Pharmacie* 40 (1817): 88-97.

6. Peck L., *et al.* "Maxillary canine-first premolar transposition, associated dental anomalies and genetic basis". *The Angle Orthodontist* 63.2 (1993): 99-109.
7. Shuchi Tripathi., *et al.* "Maxillary canine transposition e A literature review with case report". *Journal of Oral Biology and Craniofacial Research* 4 (2014): 115-158.
8. Peretz B and Arad A. "Bilateral transposition of maxillary canines and first premolars: case report". *Quintessence International* 23 (1992): 345e-348.
9. Shapira Y and Kuftinec MM. "Tooth transpositionsda review of the literature and treatment considerations". *The Angle Orthodontist* 59.4 (1989): 271e-276.
10. Shapira Y and Kuftinec MM. "Maxillary tooth transpositions: characteristic features and accompanying dental anomalies". *American Journal of Orthodontics and Dentofacial Orthopedics* 119.2 (2001):127-134.
11. Peck L., *et al.* "Maxillary canine-first premolar transposition, associated dental anomalies and genetic basis". *The Angle Orthodontist* 63.2 (1993): 99-110.
12. Parker W. "Transposed premolars, canines, and lateral incisors". *American Journal of Orthodontics and Dentofacial Orthopedics* 97.5 (1990): 431-438.
13. Peck S., *et al.* "Mandibular lateral incisor–canine transposition, concomitant dental anomalies, and genetic control". *The Angle Orthodontist* 68.5 (1998): 455-466.

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