

Esthetic Management of Transposition of Canine in Young Male Patient by All Ceramic Restoration: A Case Report

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ABSTRACT

Background: An infrequent anomaly in the production of dentition is a dental transposition. It affects both aesthetics and function if left uncorrected. This is a serious disruption of the eruptive location of the tooth and its sequence, affecting some teeth that occur at any of several distinct mouth locations. There are many kinds of tooth transposition, and their classification depends on the teeth involved, these are The Maxillary canine-first premolar, Maxillary canine-lateral incisor, has six types of transpositions. Tooth transpositions are rare, and they can be complete or incomplete. The aetiology of transposition is still obscure. This is challenging treatment for selected cases is described, including the mechanics and sequencing used to align the completely transposed teeth to their normal anatomic position in the arch. The long-term aesthetic outcome warrants the longer treatment time and greater efforts required in the successful treatment of this unusual abnormality. This condition is frequently observed in the maxillary arch and most commonly involves the canine tooth. It described as an interchange in the position of two teeth within the same quadrant of the dental arch. This article focuses on canine transposition and aims to present the esthetic management of transposition of canine in a young male patient by all-ceramic restoration.

Keywords: Canine transposition, Peg-lateral, Ectopic eruption, Composite veneers, Smile design.

INTRODUCTION

Dental transposition is known as the positional exchange of two adjacent teeth or the eruption of a tooth in a position normally occupied by a non-adjacent tooth.¹ Transposition is an eruption anomaly characterized by the positional exchange within the same arch of two permanent teeth.² Genetics is primarily due to the etiology of transposition of teeth. More often than bilateral transposition, unilateral transposition has been documented, with the left side being more frequent.^{3,4} It is most commonly seen as the most often involved tooth in transposition in the maxilla with the maxillary canine.⁵ The permanent maxillary canine typically transposes with the first premolar and sometimes with the lateral incisor.⁶ The transposition of the maxillary canine affects

both dental and facial aesthetics. It is a challenge to rehabilitate the patient with missing anterior teeth followed by transposition of one or more teeth in the "smile" zone.⁷ Patients who are unable to undergo orthodontic treatment and implant surgery are treated alone with prosthodontic treatment, keeping in mind the concepts of smile aesthetics. The size and shape of the anterior maxillary teeth represent the individual's personality and show a strong presence. It is a challenging task to treat teeth with abnormalities and restore them to their proper shape and contour, especially where orthodontic treatment can not be performed, and implant treatment is not affordable. Ceramic prosthesis with a fixed denture, ceramic veneers, and laminates are some of the prosthetic treatment

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options considered in such clinical situations. These patients require multidisciplinary treatment planning to achieve a long-term aesthetic and functional result. In females, tooth transpositions are more frequently found, and the Incidence of unilateral transpositions on the left side is higher. Transpositions are also associated with upper lateral incisors that are peg-shaped or congenitally absent, retention of deciduous canines, neighbouring mal-posed teeth, and rotations. Certain dental abnormalities also follow tooth transposition. Hypodontia, developmentally missing, small or peg-shaped maxillary lateral incisors, extreme adjacent teeth rotation and malposition, retained deciduous teeth, dilaceration and malformation of other teeth have been most commonly recorded in combination with transposition. The most common transposition observed in human dentition has been documented by canine transposition⁸. The distinction in the full case of transposition, the crowns and the roots of the teeth concerned is in the transposed position, while the crowns can be transposed in an incomplete case of transposition, while the root apices remain in their usual position.⁹ In order to assess the Incidence of tooth transpositions, different populations have been studied. These include Chattopadhyay et al.,¹⁰ of India. In African Burnette et al. ¹¹. Swedish Thilander et al¹²., Saudi Arabian Ruprecht et al. ¹³, Turkish Yilmaz et al. ¹⁴, and populations of Scottish Sandham et al.¹⁵ According to Peck and Peck, transpositions have been classified as Maxillary canine-first premolar (Mx. C.P1). Canine-lateral incisor maxillary (Mx. C.I2). Maxillary canine (Mx. C to M1) to first molar site. Lateral incisor-central incisor maxillary (Mx. I2.I1). Maxillary canine at the central incisor site (Mx. C to I1). Mandibular lateral incisor-canine (Mn. I2.C) Peck indicated that the canine and the lateral incisor are involved in 20 percent of the transpositions that take place on the maxillary arch. Though they are unusual, the maxillary lateral and central incisors may be involved in transpositions. Mn. I2.C is rare among all transpositions, with a prevalence rate of 0.03 per cent. According to various scholars, their prevalence varies and has been found to occur in 0.38% of patients in Turkey, 0.13% of patients in Saudi Arabia, 0.43% of patients in India and 0.14% of patients in Nigeria. A tooth eruption in a location normally occupied by a tooth that is not adjacent Peck and Peck, Sabri et al.,¹⁶.

Incidence rates in the general population of 0.13-0.4 percent are much rarer than simple maxillary canines affected (3 percent) (Chattopadhyay and Srinivas). Canine transposition can be considered an extreme form of ectopic eruption, accounting for approximately 15-30 percent of all transpositions with mandibular transpositions Ali et al.,¹⁶. This case report aims to present the esthetic management of transposition of canine in the young male patient by all-ceramic restoration.

CASE REPORT

A 24-year male patient reported to the Department of Prosthodontics, Crown and Bridge at Rama Dental College Hospital & Research Center Kanpur, with the chief complaint of the missing tooth and unsatisfactory look. Detailed case history and examination was made. The patient gave the history of an accident two years back, which led to the loss of the upper right tooth and also discolouration of the upper right front tooth. Radiographic and intraoral examination: An old IOPA which (four-five years old) revealed transposition of the right canine- lateral incisor. (Figure1) and 11 was discoloured and root canal treated. (Figure 2) and 13 was present in place of 12 which was missing (Figure 3).in (Figure 4) Lateral incisor on the contralateral side was peg-shaped, and the Periodontal condition of patient's all the teeth were good.



Fig 1: IOPA of transposition of right canine with lateral incisor.



Fig 2: Endodontically treated teeth with discoloration.



Fig 3: Right lateral incisor missing



Fig 4: Left Peg lateral incisor.

TREATMENT PROCEDURE

To achieve appropriate aesthetics, treatment options were considered to remove space and correct tooth anatomy of transposed and malformed teeth. Implants were considered a therapeutic choice, but only prosthetic solutions were concentrated on due to the patient's unwillingness. In relation to the right central incisor and right canine and composite veneers planned for peg lateral, fixed prosthesis was planned. It was

determined to contour left peg lateral incisor and right lateral incisor as canine aesthetically contoured. After mock tooth preparations, the diagnostic mockup was carried out to determine and adjust any defects in the treatment plan. Tooth preparation is done in relation to right central incisor and transferred canine for full coverage all-ceramic restoration (figure 5).and then canine was reduced approximately to be contoured as a lateral incisor. Tissue management was done with double cord retraction technique. Definite impressions were made from a combination of light-bodied and medium-bodied elastomeric impression material. Casts were poured, and diagnostic mockup was repeated. The putty index was made, and temporization was done in order to maintain the gingival margins after the tooth preparation. After two-three days the pre-glazed trail was made, margins were assessed, and the three-unit bridge was cemented with resin cement. (figure 6). and restoration and modification of peg-shaped left lateral incisor with composite veneer (Figure7). The patient was happy with the outcome as his aesthetics was greatly improved. (Figure 8).



Fig 5: Tooth preparation.



Fig 6: All ceramic bridge in position.



Fig 7: Restoration of left peg lateral by Composite veneer.



Fig 8: Post-operative view with the final restoration.

DISCUSSION

The jaw canines are necessary keystones within the dental arch, each permanent esthetics and traditional masticatory operate.⁷ Positioned at the corner of an open mouth, and the maxillary canines are esthetically important in maintaining harmony and symmetry of the dental arch. They are also chiefly responsible for lateral excursion movements of the lower arch. Unilateral transposition has been reported more often than bilateral transposition with the left side being mostly involved than the right.³ Transpositions affect both genders but have more female preponderance. Transposition is never seen in deciduous dentition. Maxillary canine-lateral incisor transposition is rare, affecting both dental and facial aesthetics. Transposition is greatly attributed to genetics, but there can be other etiological possibilities such as retained deciduous teeth, Abnormality in eruption pattern of permanent teeth, History of trauma. Transposition may be complete or incomplete. In complete transposition, each the crowns and also the roots of the concerned teeth are parallel in their reversed positions. In incomplete transposition (also called

"pseudo" or "partial") the crowns may be transposed while the root apices remain in their normal positions or the crowns may be in the correct order while the root apices are transposed. In maxillary canine-lateral transposition, there are basically two problems that need to be taken care of: the ability of the lateral incisor to function as a canine and also the ability to disguise the canine and lateral tooth as one another. These patients require multidisciplinary treatment planning to achieve a long-term aesthetic and functional result. If transposition is left uncorrected, it affects both function and esthetics. Several factors have been proposed regarding the aetiology of transposition abnormalities. In recent years, analysis has tried to see the aetiological factors of various transposition abnormalities and instructed a genetic influence of the jaw canine and also the initial tooth transposition. They also found a strong relationship between Mn.I2.C, tooth agenesis and a peg-shaped maxillary lateral incisor and concluded that the Mn.I2.C anomaly was genetically determined. It was also reported that the main cause of transposition in the maxilla was the displacement and migration of the canine, whereas in the mandible, it was caused by the distal migration of the lateral incisor.⁹ One theory suggests that an interchange in the position of tooth buds during the very early stages of tooth development is responsible for this anomaly. The second, a more acceptable explanation, is that the developing tooth migrates from its normal path during the course of the eruption. However, genetic aetiology was strongly supported by Peck and Peck, and by Nelson. Chattopadhyay and Srinivas found a male predominance in their transposition sample, which is distinctly different from earlier reports from India and elsewhere. We believe that, because most of the previous samples were from orthodontic clinics, a high female count could be expected because more females than males seek orthodontic treatment. Shapira et al. found a high prevalence of agenesis of third molars, impacted maxillary canine, and maxillary canine- premolar transposition in patients with Down's syndrome.

Clinical examination accompanied by a full radiographic survey is the basis of early diagnosis and identification of emerging transposition. The orthodontic operation was ruled out in this case for a 24-year-old adult without lateral incisor, but the decision was made to correct the transposition

prosthetically. In relation to right incisor and right canine and also composite veneer for the lateral peg on left lateral incisor, the fixed prosthetic was. The option of shade between composite veneers and the ceramic prosthesis was difficult, but diligent efforts were successfully implemented. It was done to restore the transposed canine as a lateral incisor to achieve smile aesthetics, bearing in mind tooth anatomy and prosthetic material limitations. In order to achieve appropriate smile aesthetics, labial contours, incisal embrasures, and shade matching were given importance.

CONCLUSION

Tooth transposition can be effectively treated, but seldom experienced, with cosmetic dentistry applying basic smile design fundamentals. Patient needs should be carefully measured, as the anterior teeth are directly linked to the patient's psychology. An unusual dental phenomenon, affecting both dental and facial aesthetics, is maxillary canine-lateral incisor transposition. To achieve a long-term cosmetic and functional outcome, multidisciplinary treatment planning is required. The conservative prosthetic treatment for transposed canine is provided in this case report by adjusting the shape of the tooth and offering a three-unit cantilever all-ceramic bridge.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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