

Transposition of Mandibular Premolar Teeth – A rare Case Report**Arvind Jain¹, Sandhya Dewangan², Bishwajeet Das³, Dipika Jain⁴, Sumit Jaiswal¹, Sohil Jain⁵**

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ABSTRACT:

The Transpositioning of teeth is a developmental anomaly which is manifested interchange in the position of two permanent teeth. Obviously, an in depth analysis of its etiopathogenesis is required. It is important to focus on common as well as rare cases of transposition. Tooth transposition is of several types and their classification depends on the teeth involved. Treatment of this disturbance should take into account aspects such as facial pattern, age, malocclusion, tooth-size discrepancy, stage of eruption, and magnitude of the transposition. The often selected options by the practitioners are simpler, like permanent teeth extraction that is a procedure which is irreversible and may bring about harm to the patient. This paper reports a case of tooth transposition, in mandibular arch involving the left second premolar and first molar. Also discussion is made on an interesting phenomenon known as transposition.

Keywords: Transposition, Tooth, Malocclusion, Premolar.

INTRODUCTION

Transposition was first described by Harris in 1849, as an aberration in the position of teeth.¹ Tooth transposition is an alteration initially reported in the 19th century, and its terminology has been changing.² Tooth transposition can be defined as the positional interchange of two neighboring teeth and especially of their roots, or the development or eruption of a tooth in a position normally occupied by a non-neighboring tooth. Therefore, tooth transposition can be considered a unique type of ectopic eruption wherein the sequencing and order of teeth are interchanged in the dental arch.³ It's in fact, a peculiar and a very extreme type of ectopic eruption in which a permanent tooth develops and then erupts in a position which is normally occupied by some other permanent tooth. An interchange in the original position of two adjacent teeth in the same quadrant of the dental arch is also known as transposition.⁴ Whereas, ectopic eruption refers to an

abnormal eruption path taken by a tooth.⁵ Canines and lateral incisors remain the most common teeth involved.^{6,1} A few cases of mandibular second premolar and first molar have also been reported in literature.^{7, 8} Transposition may be unilateral or bilateral.⁹ Also bilateral transposition is less common than unilateral transposition and usually involving the left side. Transposition occurs much more commonly in the maxilla than the mandible.^{10,11} Tooth transposition in mandibular arch is extremely rare (0.003%).¹ Among the many types of transpositions, the one most often reported remains to be the maxillary canine-premolar transposition because of its most frequent occurrence.¹² Tooth transposition is usually associated with other dental anomalies in the same patient, such as hypodontia, peg-shaped teeth, severe rotations and bad positioning of adjacent teeth, retention of deciduous teeth, dilacerations, and malformations of other teeth.² Tooth

transpositions are more commonly observed in females and the proportions observed in ratio of male and female are – 1:2, 1:1.55, 1:3.8 and 2:3.^{13,14} Tooth transposition can adversely affect the normal dentition both from the esthetic and functional aspects and therefore, it is important to know the etiological factors affecting the incidence and prevalence of this abnormality so that possible preventive measures can be established. There are various factors responsible for the etiology of tooth transposition along with numerous existing theories describing variables related to the location of the transposition and involvement of particular teeth.¹⁵ The present case report is one of the rare case report.

CASE REPORT

A 43 years old male reported to Jain Dental Hospital, Raipur, with the chief complaint of sensitivity of teeth. (Figure-1) Clinical examination showed Angle's class-I molar relationship. The family history or medical history showed no significant findings. On intra-oral examination, the root canal treated mandibular left second premolar was present in place of mandibular left first molar and mandibular left first molar in place of second premolar [Figure-2]. Over-jet and overbite was normal. Generalized attrition was present. Other than this, there was no other abnormality in the oral cavity. IOPA radiograph further confirmed this entity (Figure-3) with no other associated abnormality in the maxillary or mandibular arches.



Figure 1: Showing patient's face; Figure 2: Showing transposition of mandibular left second premolar and first molar.



Figure 3 Showing intra oral periapical radiograph confirming transposition.

DISCUSSION

A French Dentist, Miel (1817) was apparently the first to describe in detail the anomaly maxillary canine-premolar transposition.¹⁶ Sandham and Harvie conducted a study on some school children of Scotland and they concluded that out of a sample of 800 around 0.38% were seen to have transposition, these findings were again supported by a study done in India where the occurrence was found to be 0.4%. Thilander and Jakobsson reported prevalence of 0.26% in Swedish school children.⁵ Transposition may be complete or incomplete.¹⁷ Complete transposition is another condition characterized by transposed positions of both crowns and the entire root structures of the involved teeth. Whereas in "pseudo" or "partial" transposition or incomplete transposition where the crowns may be transposed whilst the root apices still remain in their normal positions or vice versa. The teeth which are involved do overlap and also with long axes crossing each other. Additionally, there can complete superimposition in the crowns and roots on each other among the involved teeth on normally projected radiographs.⁵ Morphology and growth pattern of connective tissues of jaws are responsible for physiologic tooth migration and tooth eruption path.¹⁵ According to Kuttapa *et al.*¹⁸ etiological possibilities include genetics, retained primary teeth, deviation of eruptive path of permanent teeth and abnormality in the sequence of eruption of permanent teeth. There have been no studies reporting transposition in the deciduous dentition. Transposition and its etiology has always been the subject of most controversies and still not understood completely. There are

Several theories which have been proposed to explain the phenomenon.⁵ The eruption path of tooth generally follows orientation of root which can be influenced and altered by adjacent structures like maxillary spaces, variations in the growth speed and mechanical interferences. Traumatic injuries to deciduous teeth and bone pathologies such as nonunion, cyst and tumor formation leads to disturbance in eruption path of permanent tooth germs.¹⁵ Theories like the role of trauma and an interchange in the position of the tooth buds during development, inadequate root resorption of deciduous canine, early shedding of deciduous teeth, and retention of deciduous teeth for more than normal have been put forward to explain the phenomenon. However, the main etiologic factor still remains to be of a genetic origin.¹⁹ There is a hypothesis explaining a genetic implication for transposition that it may be due to a disturbance in the order of developing tooth follicles. Genes do play a very important role in the patterning of the dentition. Within a purely genetic model, the canine, because of its position at the boundary between the developing incisor and premolar fields of development which is a region that is possibly more susceptible to particular thresholds of gene activity for normal pattern to occur, the tooth might be transposed more commonly.²⁰ In forensics dental identification can be done for identifying the deceased or the assailant in a crime scene or for identification of victims of a mass disaster. India is a country which is very much prone to natural disasters, averaging of at least eight major natural calamities a year. While floods, cyclones, droughts, earthquakes and epidemic are frequent from time to time, major accidents also occur in railways, mines and factories causing extensive damage to human life and property. One such condition which can be found in the dental records of the person is transposition, which is one of the most difficult of clinical situations to treat and is a condition that has been observed and can be used for person identification.⁵

When treating transpositions, there are many factors that can affect the treatment results which should always be kept in consideration, including the esthetics, occlusion, treatment period, patient comfort, patient cooperation, and periodontal support. Beyond the factors listed above, Age is the noticeable factor, which is correlated directly with the tissue regeneration.^{10, 15} The patient should always be made aware of the risk factors to the adjacent teeth and their supporting structures before commencing the treatment.¹

CONCLUSION

Tooth transposition is one of the rare developmental dental anomalies that effect esthetics and function. It renders a great challenge towards a noteworthy treatment approach to restore esthetics and function. To the best of our knowledge this rare case of mandibular second premolar and first molar transposition has never been reported earlier. The findings in this case report might give some insights regarding transposition.

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