

An unusual case of incomplete tooth germ transposition: A rare case report

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Abstract

Transposition is an exchange of positions of two adjacent teeth. This is a condition with an incidence of 0.33%. Etiology is multifactorial; genetic influence is the most supported cause. Dental transposition is a multifactorial condition. While transposition of tooth germ is the rarest condition, this helps in identification of a person in mass casualties due to any disaster, or crimes, fraud. The present case is an incidence of incomplete transposition of right mandibular permanent second molar tooth germ, causing resorption of the roots of permanent first molar with possible loss of that tooth, which is a unique presentation.

Key words: Permanent second molar, tooth germ, transposition

Introduction

Transposition of tooth was first knowingly reported by Miel in 1817.^[1] It was argued that this was a type of ectopic eruption of teeth. It was later defined by Peck *et al.*^[2] as a dental anomaly characterized by the exchange of position between two adjacent teeth, especially in relation to their roots, or development of eruption of a tooth in a position normally occupied by a nonadjacent tooth.

It is estimated that <1% of the population is affected by transposition.^[3] Transposition is more in maxilla than in mandible. It can be complete or incomplete and can occur unilaterally or bilaterally. Both males and females affected equally.^[3] The etiology mainly being the genetic factors,^[4] over-retained primary teeth, ectopic eruptions, trauma, cleft lip and palate, presence of cysts and tumors.^[3]

There are five anatomical variations which are seen in the maxilla and two in the mandible. The most common

one is the maxillary canine and the premolar, followed by mandibular canine and lateral incisor.^[5,6] Duncan and Crawford, in 1996, reported the transposition of primary maxillary central and lateral incisors.^[7] Transposition of tooth germ is also seen and it is a rare condition.

The arrangement of teeth in every individual is unique and also the morphology of teeth. Age, sex, ethnicity/race, occupation, and habits can be determined by teeth of an individual. Rare anomalies such as complete/incomplete transposition of teeth in a person will be crucial in identifying a person in various aspects of forensic odontology.^[4]

In this case report, we discuss an incomplete transposition of right permanent second molar germ in mandible causing resorption of permanent first molar teeth.


Case Report

An 11-year-old male patient visited our dental hospital along with the parent with a chief complaint of pain in

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the lower right molar region for a week. The patient had visited a dentist for the same problem 6 months back, but only restoration was done on the right lower permanent first molar teeth.

During the examination, the patient had mixed dentition. Gingival swelling was present on the distal end of permanent first molar along with Grade 1 mobility. Periodontal pocket of 8 mm was present on the distal side of the tooth. The patient also complained of the tooth being tender on percussion.

For further diagnosis, the patient was advised both intraoral periapical radiograph (IOPA) and orthopantomograph (OPG), to check any endo-perio lesion, a gutta-percha cone was inserted on the distal side of the first molar and IOPA was taken.

The OPG revealed an interesting finding. The mandibular right permanent first molar roots were being resorbed and mandibular right permanent second molar tooth germ was being under the first permanent molar [Figure 1]. The erupting force of second molar was causing resorption of roots of first molar since second molar tooth germ is below it.

The IOPA revealed that there is a bone loss distal to the first molar, and the gutta-percha tip placed goes all the way till the second molar occlusal table crossing the resorbed distal root of the first molar [Figure 2].

Since the movement of the tooth germ or first molar was not possible, as the best possible treatment at the present condition, the patient was advised to get the first permanent molar removed so that second molar takes up its place after eruption.

Discussion

The accepted theory is that the migration of tooth from its normal path of eruption will cause in transposition.^[2] Interchange of the position of tooth buds during early stages of tooth development may be another cause. As we have



Figure 1: Orthopantomograph of an 11-year-old patient

mentioned earlier, many more etiological factors can be a cause, but the genetic influence is strongly supported by Peck *et al.*^[2] and Nelson.^[8]

A latest meta-analysis on the prevalence of transposition of tooth was done, and average prevalence was 0.33%.^[9] Studies showed the prevalence of 0.38% in Turkey, 0.40% in India, 1.4% in Nigeria, 0.09% in Greece, and 0.13% in Germany. This suggests that the transposition of tooth is a rare phenomenon.^[9]

Transposition of tooth germ is the rarest condition, and a very few case reports have been reported. The etiology for this condition does not differ from any other transposition. The first case reported of permanent tooth germ transposition was by Ono *et al.*,^[10] due to extrusion of calcium hydroxide root canal filling material with silicone in a deciduous tooth. Ranta^[11] reported six patients with cleft lip and palate with transposed tooth germs before the formation of roots.

In the case described, an incomplete transposition of tooth germ of right second mandibular permanent molar mesially is seen, which is also causing resorption of roots of permanent first molar either due to natural eruptive forces or due to incomplete transposition. Patient or the parent did not give any history of trauma to that region, and no other possible causative factor can be confirmed other than assumption being genetic reasons.

In a similar case that was reported, resorption of maxillary central incisor was seen due to ectopic eruption of canine because of the migration of tooth germ.^[12] In another case, a displacement of tooth bud resulted in the transposition of the lateral incisor and canine in the mandible and subsequent ectopic eruption a reported due to trauma.^[13]

A recent case report mentioned the complete transposition of mandibular first and second molar,^[14] which was diagnosed

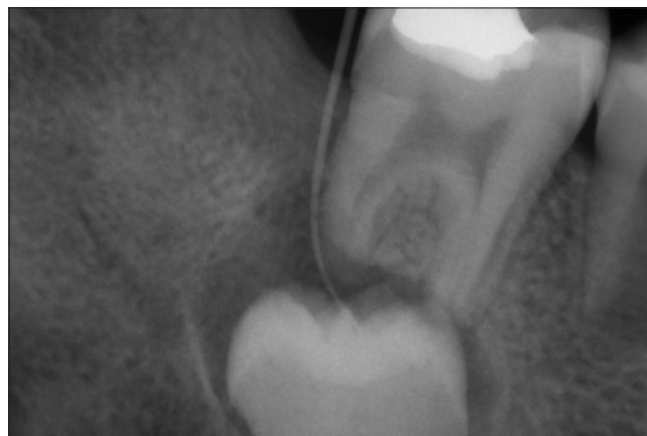


Figure 2: Intraoral periapical radiograph of compromised tooth with gutta-percha cone

when the patient went to a dentist with a complaint of unerupted permanent molar tooth.^[14] Whereas in the present case, the patient has pain, periodontal pocket, and also resorption of roots of permanent first molar because of incomplete transposition.

Various studies strongly suggest that etiology of transposition may be genetic or multifactorial. The treatment aspect of these conditions is mainly orthodontic corrections. However, in the present case, extraction of permanent first molar was suggested as sufficient space cannot be gained to align the tooth or stop the resorption.

Forensic importance of transposition of tooth

Forensic odontology is a newer branch in dentistry which plays a key role in identification of a person in mass casualties due to any disaster, or crimes, fraud, and it is usually based on disturbances of tooth eruption, malocclusions, and/or previous dental treatments, changes brought about by age, pathological conditions, and developmental disturbances.^[15]

Forensic identification of an individual is accomplished by various methods such as age, sex, race identification, comparing postmortem and antemortem dental photographs and radiographs of deceased person, and also checking any dental anomaly.^[16]

The methods of dental age estimation can include analyzing tooth development and eruption, studying tooth degradation, measuring biochemical and trace element changes in dental structures.^[17] One of the most common dental age estimation methods is Demirjian's method.^[18]

Both primary and permanent dentitions vary in size, shape, and appearance, which is unique in different individuals.^[19] Furthermore, every tooth has unique characteristics called "tooth class characteristics" which is the basic in identification.^[20] The presence of dental anomalies such as supernumerary tooth, transposition, talon cusp, or any other rare abnormality helps in easier identification.

Tooth transposition is a rare disturbance of tooth eruption which will definitely have an important role in forensic studies. In the present case, partial transposition of right permanent mandibular second molar tooth germ occurred in such a way that it challenged the existence of right permanent first molar, and the first molar had to be extracted so that the second molar can take up the first molars place.

Hence, "the person with missing molar due to transposition" highlighted in his dental records will definitely help in forensic studies or identification if needed.

Conclusion

Dental transposition is a multifactorial condition. Transposition of tooth germ is the rarest condition, and only one case of complete transposition of mandibular molar is reported till date. Being rare, transposition of tooth can be of great help in forensic odontology for easier identification in various situations. The present case is a unique presentation where incomplete transposition of tooth germ is causing resorption and possible loss of the adjacent tooth.

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Conflicts of interest

There are no conflicts of interest.

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