Intraosseous Transmigration of Impacted Canines: Report of Five Cases
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Abstract
Transmigration is a rare and unusual anomaly involving the intraosseous migration of impacted tooth across midline regardless of the distance. This occurs almost exclusively with mandibular canines. Etiology is still unclear and is not well documented in the literature. Transmigration can occur as isolated finding or in association with other findings such as dentigerous cyst, odontomas, impactions of other teeth etc. Transmigrated canines are particularly significant due to aesthetic and functional importance. Early radiographic examination of the patient is important for the treatment. More documentation of this anomaly and future studies may lead to a better understanding of this rare anomaly, its etiology and improvement of the classification criteria. This paper presents five cases of transmigration of mandibular canines of which two were associated with dentigerous cyst, one associated with bodily rotation of canine, one associated with absence of third molars on right side.

Keywords: Impacted Canine; Tooth Migration; Transmigration; Intraosseous; Dentigerous Cyst; Observation.

Introduction
Impacted teeth are important in dentistry and are particularly significant in orthodontics, especially if the impacted tooth is a canine. The occurrence of impacted mandibular canine is rarer than maxillary canine and it is even rarer phenomenon when such an impacted mandibular canine migrates to the other side of mandible crossing the midline.\(^1\) This rare phenomenon of the tooth crossing the midline is known as dental transmigration and it occurs almost exclusively with mandibular canines\(^2\) with an incidence of 0.1%.\(^3\)

The exact mechanism of transmigration is not clear.\(^2\) This anomaly is most often asymptomatic with no pain or over pathology, and usually cannot be detected during the routine clinical examination. Mandibular transmigration is rarely discovered on routine intraoral periapical view because the tooth is most frequently horizontally impacted under the apices of permanent teeth adjacent to the mandibular border. Similarly a palatally impacted canine is sometimes horizontal positioned very high in the palatal vault, close to the floor of nasal cavity and thus might not be detected. Therefore when any permanent tooth is missing, a panoramic radiograph is essential.\(^4\)

Since impacted or transmigrated teeth are important especially in terms of orthodontic treatment planning, these teeth must be diagnosed clinically and radiographically. Early diagnosis with timely treatment can help dentist preserve the canines, which play an important role in both aesthetics and function in human dentition.\(^2\) Future studies and more documentation of this anomaly may lead to it's inclusion as one of developmental anomalies of teeth and better understanding of this rare condition.\(^5\)

The present paper reports five cases of transmigrated canines of which two were associated with dentigerous cyst, one with absence of two third molars, other was associated with bodily rotated lower canine in mesiodistal direction.

Case Report: Case 1:
The 22 year old male reported to department of oral medicine with a complaint of retained mandibular right and left primary canine. Intraoral examination showed absence of both permanent lower canines and retained both lower primary canines. Panoramic view revealed both mandibular permanent canines to be impacted. The right and left mandibular canines were unerupted and both were mesioangularly impacted with the left canine crossing the midline and the right
canine positioned very close to the midline. Right upper and lower third molars were absent. There was no pathologic finding associated with both impacted canines. The patient was asymptomatic and was informed of the condition and radiographic monitoring was strongly recommended (Fig 1).

![Image](image1)

**Figure 1:** The panoramic radiograph showing the both the mandibular left canine crossing the midline and right canine close to midline.

**Case 2:**
A 24 years old male reported to the department of Oral Medicine for oral prophylaxis. Intraoral examination revealed absence of right permanent mandibular canine and retention of right mandibular primary canine. Radiographic examination revealed transmigrated horizontally impacted right canine at the inferior border of the mandible with its crown positioned below the root apices of right premolars. Bodily rotation of left canine in mesiodistal direction was seen along with impaction of all the third molars (Fig 2). Patient was informed of the condition and regular radiographic follow up was advised.

![Image](image2)

**Figure 2:** The panoramic radiograph showing horizontally impacted canine of right side near inferior border of mandible below the apices of premolar.

**Case 3:**
A 69 years male reported to department of oral medicine for construction of prosthesis. Intraoral examination revealed slight bulge in the lower anterior region. Patient was completely edentulous. The panoramic radiograph indicated the left mandibular canine was impacted mesioangularly with part of crown crossing the midline. The crown of this canine was surrounded by a cystic radiolucency (Fig 3). Patient was treated by surgical removal of cyst along with the involved tooth and histopathological examination confirmed the cyst to be dentigerous cyst.

![Image](image3)

**Figure 3:** The panoramic radiograph showing the left mesioangularly impacted canine surrounded by a cystic cavity.

**Case 4:**
A 17 years male reported to department of oral medicine with a complaint of swelling in the lower front of jaw. Intraoral examination revealed a nontender, slightly firm swelling in the left side of lower jaw with the expansion of buccal cortical plates. Radiographic examination revealed transmigration of the left impacted mandibular canine across the midline and was associated with radiolucency along with buccal cortical plate expansion suggestive of dentigerous cyst (Fig 4). Surgically the cyst was enucleated along with the removal of involved tooth and histopathological examination confirmed the lesion to be dentigerous cyst.

![Image](image4)

**Figure 4:** The panoramic radiograph showing impacted canine crossing the midline and associated with large cystic space.

**Case 5:**
A 12 years old male child reported to department of oral medicine with a complaint of decayed tooth in right lower back region.
Intraoral examination revealed a mesioangular impaction of left canine below the apices of the left incisors with it's follicular space just touching the midline. According to Howard's criteria complete transmigration was expected. Patient was informed of the condition and radiographic follow up was advised.

Discussion
Transmigration is an extremely rare phenomenon. The term transmigration was first used by Ando et al in 1964. Tarsitano et al. defined transmigration as the phenomenon of an unerupted mandibular canine the midline. Joshi and Acluck et al suggested that the tendency of a canine to cross the midline suture is a more important consideration than actual distance of migration after crossing the midline.

Although the first published cases were detected as a result of neurological changes caused by the compression of lower dental nerve by the impacted tooth radiology has made it possible to detect similar but symptom less cases allowing an adequate assessment of the percentages of cases which are presented clinically.

Patient presenting this anomaly range from 8-62 years. One case of in the present paper was 69 years old and was completely edentulous. Therefore transmigration can be seen in any age group. Transmigrations are more in females, with female to male ratio being 2:1. But all our cases were of male patients.

The etiology and exact mechanism are still not clear. Number of factors has been suggested. Abnormal displacement of the dental lamina in the embryonic life is commonly accepted explanation of the cause of displacement and non eruption of such cases. Some suggested it may be due to abnormally strong eruptive force and conical shape of the canine which drives canine through dense symphysis. Some suggested that agenesis of the adjacent teeth in particular the lateral incisor, may favor the retention of primary canines and the excess space in dental arch may account for the absence of a correct guide for eruption. Al-Waheidi and others suggested that transmigrated canines are associated with cystic lesions and that the presence of cyst at the crown of the canine may facilitate the migration process. However it was also noted that it may not be possible to decide whether pathological condition were responsible for transmigration of the teeth or not. Aydin and Yilmaz, Camilleri reported cases of transmigration associated with dentigerous cyst. Transmigration is also associated with other pathological conditions such as odontomas, hypodontia, impaction of other teeth. The other suggested etiologies are premature loss of deciduous teeth, retention of deciduous teeth, inadequate space, crowding, excessively large crowns, odontoma, fractures, cysts, tumors, unfavorable alveolar length, genetics, root stump obstacle would be sufficient to divert a tooth from its original path of eruption.

Howard expected the older patient would show greater distance of travel because a longer time had been available for migratory canine to travel.

Mupparapu described the five patterns for transmigrated mandibular canine.

**Type 1:** Canine positioned mesioangularly across the midline within jaw bone, labial or lingual to anterior teeth and crown portion of the tooth crossing the midline.

**Type 2:** Canine horizontally impacted near the inferior border of mandible below the apices of the incisors.

**Type 3:** Canine erupting either mesial or distal to the opposing canine.

**Type 4:** Canine horizontally impacted near the inferior border of the mandible below the apices of either premolar or molar on the opposite side.

**Type 5:** Canine positioned vertically in the midline (the long axis of the tooth crossing the midline) irrespective of eruption status.

Type 1 is most common, followed by type 2, type 4, type 3 and type 5. The present case reports of 1, 3, 4 and 5 were of type 1 and case 2 was of type 4 pattern.

Howard observed that those unerupted canines that lie between 25 and 30 in the mid sagittal plane do not migrate across the midline. Those canines that lie between 30 and 95 tend to cross the midline. An overlap appears to exist between 30 and 50, when angle exceeds 50 the midline becomes a rule. In case 1, bilateral transmigration might be possible, as right canine has favorable angulation for transmigration and has migrated close to midline.

From the present case reports it can be observed that:
1) All the cases except case 3 had retained primary canines.
2) The tooth deviates for no apparent reason.
3) The direction of all the transmigrant canines was mesial.
4) In case 3, transmigration occurred in edentulous 69 years old patient, transmigrant had just crossed the midline though longer time was available for migrant to travel a greater distance.
5) Four cases were associated with some findings case 1 was associated with absence of right side third molars, case 2 was associated with bodily rotation of other lower canine, case 3 and 4 were associated dentigerous cyst.
6) All cases of transmigration were seen in male patients.

The several treatment options proposed for this anomaly. 6,10-16 Surgical extraction appears to the most favored, rather than heroic effort to bring the tooth back to its position. It is also indicated in existence of pressure resorption of roots of adjacent teeth, periodontal problems, infections, cysts, prosthesis problems, neuralgic symptoms etc. Contra lateral nerve should be anesthetized for extraction of transmigrated tooth as they maintain their nerve supply from original side. If the mandibular incisors are in normal position and space for the transmigrated canine is sufficient, transplantation may be undertaken.

Orthodontic treatment can be done to bring back the labially impacted transmigrated canine to position. However if the crown of such a tooth migrates past the opposite incisor area or if the apex is seen to have migrated past the apex of adjacent lateral incisor it is impossible to bring back it into original place. Some authors believe that symptom less non erupted teeth can be left in place. In these patients, a series of successive radiographs should be taken periodically. In the present cases, case-1 and case-2 and case-5 were kept under observation; case-3 and case-4 were treated surgically for cyst followed by extraction of tooth.

To conclude, transmigration is a rare event and early radiographic examination of patient is important for treatment planning. Literature has shown transmigration in both mandible and maxilla with higher frequency in mandible with no specific etiology to explain the nature of this anomaly. Future studies and reports of more cases showing transmigration of canine help to better understand their mechanism of eruption and improvement of classification criteria.

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References
10. Joshi MR. Transmigrant mandibular canine: a record of 28 cases and
10. Sulabha AN et al., ISSN 2231 - 2250


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