Transmigration of Mandibular Canines: A Rare Case Report and Review of Literature

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ABSTRACT

Transmigration of permanent mandibular canines is a very rare phenomenon and has no definite etiology. Most of them are asymptomatic, impacted, and commonly involve the left canines. The eruption of transmigrated canines is even rarer. The purpose of this paper was to review the literature on erupted transmigrated mandibular canines and report a rare case of it in a 13-year-old girl with a transmigrated permanent right canine corresponding to the least frequent Mupparapu type 5 pattern.

(J Dent Child 2011;78:19-23)

Received October 11, 2009; Last Revision December 6, 2009; Revision Accepted December 7, 2009.

KEYWORDS: TRANSMIGRATION, MANDIBULAR CANINE, MALPOSITION, ABERRANT ERUPTION

Transmigration has been referred to as the preeruptive migration of a tooth across the midline.[1] Transmigration of canines has an incidence of approximately less than 1%.[2,3] Females are more frequently involved than males, as evidenced by a 1.6:1 ratio,[4] and the mandibular left canine is more often affected than the right canine.[5-7] These canines are usually asymptomatic and impacted[8]; however, they may present on the opposite side of the arch[9] or erupt in the midline.[10,11] These unerupted teeth are often found beneath the apices of the mandibular teeth and located buccally, lingually, or centrally.[12] Complications due to transmigrating teeth may include: pressure resorption of roots[2,13]; tilting of adjacent teeth; and neuralgic symptoms or migration to adjacent structures like the coronoid process[14] causing pain and discomfort to the patient. Transmigration of mandibular canines is a rare phenomenon, and transmigration of maxillary canines is even rarer.[1]

The purpose of this paper was to review the literature on erupted transmigrated mandibular canines and report a rare case of it in a 13-year-old girl with a transmigrated permanent right canine corresponding to the least frequent Mupparapu type 5 pattern.

CASE REPORT

A 13-year-old South Indian girl presented to our pediatric dental clinic with pain in the permanent mandibular left first molar experienced over the previous 7 to 10 days. Her medical history was noncontributory. A clinical examination revealed a deep carious lesion involving the mandibular left first molar, and a tooth simulating a permanent canine was noted in the midline between the 2 central incisors at the level of the gingival margin and was rotated. Other findings included the presence of a retained primary mandibular right canine and crossbite involving the maxillary left lateral incisor (Figure 1). The mandibular incisors showed no evidence of mobility, and the response of the pulp to vitality tests was within normal limits.

Radiological investigations included panoramic, occlusal, and periapical radiographs, which showed evidence of: a cariously involved mandibular left first molar with periapical abscess; a retained primary mandibular right canine; and abnormal position of a permanent mandibular right canine, with the root completely formed, in the midline (Figures 2-4).

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The treatment plan included endodontic treatment of the mandibular left first molar followed by the surgical extraction of the erupted transmigrated canine under local anesthesia (lidocaine 2% with epinephrine 1:100,000). The tooth was luxated and extracted in one piece without any complications. The postoperative period was uneventful and showed further evidence of progressive normal healing of the

Figure 1. A clinical radiograph showing a transmigrated permanent mandibular right canine erupted in the midline and a retained primary right canine.

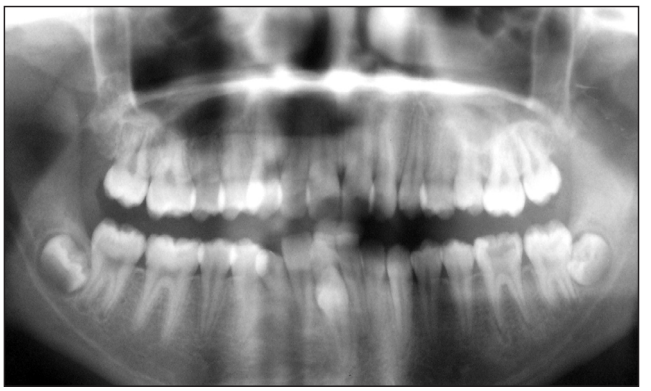

Figure 2. A panoramic radiograph showing a transmigrated permanent mandibular right canine in the midline (Mupparapu type 5).

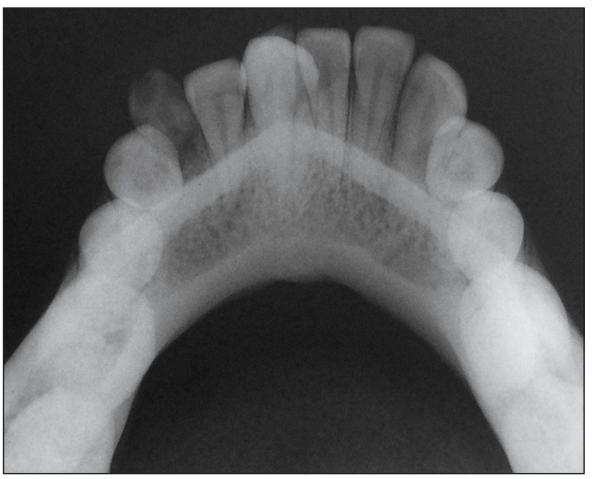

Figure 3. An occlusal radiograph.

Figure 4. A periapical radiograph.

Figure 5. A clinical radiograph taken at the 8-month follow-up visit.

Figure 6. A follow-up periapical radiograph taken at the 8-month follow-up visit.

extracted site at the 1-week recall visit. Regular quarterly follow-up visits were advised, and the patient was referred for orthodontic correction of her malposed teeth.

At 8-month follow-up, no evidence of new carious lesions was seen and the mandibular incisors responded positively to pulp vitality tests. A periodontal examination revealed normal gingival color and texture, and no gingival recession was observed (Figures 5-6). The patient did not seek orthodontic treatment due to financial constraints and is now under regular follow-up.

DISCUSSION

Transmigration has been referred to as the phenomenon where an unerupted canine moves across the midline[15] or when more than half of the tooth had crossed the midline.[7,8]

Transmigration of permanent mandibular canines has been reported to be a very rare phenomenon in the literature.[6,16] The etiology of this event remains unclear.[8] Local causes like the presence of supernumerary teeth, tumors or cysts in the eruption path, and insufficient space for eruption may predispose the teeth to erupt in abnormal positions.[2] Other suggested factors may include retention of the primary canine[6,7,13] and genetic involvement.[4]

The possible role of rich blood circulation and active alveolar bone formation during the tooth apex's developmental stage has been reported to cause distant migration.[17] Movement of impacted teeth at a high speed after root completion, however, has been documented.[18] These findings suggest that the migration of impacted teeth may occur irrespective of whether root completion has occurred or not. Marks and Schroeder[19] explained that local defective osteoclastic function due to a regional disturbance in the dental follicle may form an abnormal eruption pathway, thereby resulting in aberrant eruption of teeth.

Migration of unerupted teeth in the mandibular bone has been reported to be more frequent in premolars, canines, and third molars. Mandibular canines exhibited a mesially directed movement, whereas mandibular premolars and wisdom teeth showed movement in the distal direction.[17] The mandibular canine is the only tooth in which migration through symphysis to the contralateral side has been documented.[1,13,20,21] While maxillary canine transmigration

Table 1. Chronological Resume of Erupted Transmigrated Mandibular Canines

Author	Year	Age (ys)	Sex	Side	Position of the transmigrated canine	Over-retained primary canine
Bruszt[28]	1958	Not mentioned	Female	Left	Up to right canine	No
		Not mentioned	Female	Right	Up to left canine	No
Kaufman and Buchner[29]	1967	19	Female	Right	Up to left canine	NM
Pratt[25]	1969	19	Male	Right	Near mesial surface of left canine	Yes
Barnett[30]	1977	24	Female	Left	Up to right canine	No
Abbot et al[9]	1980	62	Female	Right	Between left canine and lateral incisor	Yes
Shapira et al[34]	1982	11	Male	-	-	NM
Sofat[31]	1983	20	Male	Right	Between the 2 central incisors	Yes
Dhooria et al[18]	1986	19	Male	Left	Erupted labial to right central incisor	Yes
Gadalla[32]	1987	22	Female	Left	Extraoral eruption of left canine in inverted position through the chin on right side	No
Vichi and Franchi[33]	1991	29	Female	Right	Erupted near left lateral incisor	No
Joshi[6]	2001	13	Female	Right	Mirror-image position on left quadrant	No
Mupparapu[20]	2002	19	Female	Left	Midline eruption	No
		21	Female	_	Midline eruption	No
Batra et al[35]	2003	15	Male	Right, left	Erupted in the midline touching each other	Yes
		22	Female	Right	Erupted distal to the left lateral incisor	Yes
Auluck et al[11]	2006	40	Male	Right	Erupted between central incisors in the midline	Yes
Present case	2010	13	Female	Right	Erupted in the midline, between central incisors labially	Yes

has been documented, only crowns have crossed the midline up to half of their length, according to reports.[3]

A higher frequency of mandibular canine transmigration in the anterior mandible has been attributed to its larger cross-sectional area compared to the anterior maxilla.[3] Transmigration of maxillary canines has been reported to be even rarer, and until now very few cases have been documented in the literature.[1,3,22] Anatomical constraints suggested include shorter distance between the roots of maxillary incisors and the floor of the nasal fossa and restriction of the path of tooth movement by the roots of adjacent teeth, the maxillary sinus, and the midpalatal suture, which act as a barrier.[13]

Mupparapu[20] carried out a retrospective study using 2,150 panoramic radiographs and found 9 cases of transmigrated mandibular canines. He established 5 types of transmigration based on the pattern of migration and position of canines in the jaw: type 1 (46%) for a canine impacted mesioangularly below incisors, labial or lingual, across the midline; type 2 (20%) for a canine impacted horizontally near the mandible's lower border, beneath apices of the mandibular incisors; type 3 (14%) for a canine erupting on the contralateral side; type 4 (17%) for a canine impacted horizontally near the mandible's lower border, beneath the apices of the contralateral canine and premolars; and type 5 (2%) for a canine positioned vertically in the midline with the long axis of the tooth crossing the midline.

Studies have pointed out that transmigrated canines erupt in approximately 5% of cases.[16,23] The case described here corresponded to Mupparapu type 5 pattern, reported as the least frequent type and involving the right canine, which makes this case an uncommon one.

Furthermore, a literature review was conducted of the cases with erupted transmigrated canines, owing to their less frequent occurrence (Table 1). This yielded a plausible finding that most of these erupted transmigrated teeth were right canines. In our literature review, we found that left canines were frequently involved in Mupparapu types 1-4, whereas right canines are more commonly involved in the least frequent type 5 patterns.

Studies have shown that transmigrated canines maintain their nerve supply from the original site, even if they cross the midline.[24,25] Treatment modalities for transmigrated mandibular canines depend on the developmental stage and distance of migration and include surgical extraction, transplantation, exposure, orthodontic alignment, and observation.[12,16] Periodic observation of asymptomatic and unerupted teeth through a series of successive radiographs also has been recommended.[9]

Wertz[26] performed orthodontic repositioning of a labially impacted transmigrated canine and further suggested surgical extraction as the only treatment of choice in subjects older than 14 years old. In a 12-year follow-up, Ioannidou and Makris[27] reported successful long-term stability in a case of autotransplanted transmigrated mandibular canine. Aras et al[22] transplanted a transmigrated maxillary canine to its normal position because of forced eruption failure. Surgical extraction of an impacted transmigrated mandibular canine in a 12-year-old patient and subsequent endosseous implant replacement also has been reported.[12]

The presence of mandibular arch crowding, inadequate space for the canine, and closed root apex excluded the options of transplantation, exposure, and orthodontic alignment in the present case. Most authors favoured surgical extraction as the preferred treatment.[6,7,21] Furthermore, concerns regarding potential pressure resorption of the incisors, including esthetic issues, made surgical removal the preferred treatment option in this case.

Based on this case report's findings, the authors emphasized the following: a) conservative management of transmigrated canines through early diagnosis and, b) importance of radiographic examination in cases with over-retention of primary canines or missing permanent canines, as transmigrated canines are usually impacted and asymptomatic. Further studies are necessary to understand this rare phenomenon and acquire incidence and demographic factors.

ACKNOWLEDGMENTS

The authors wish to thank Dr. Rajeshwari, Dr. Prasanthi, and Dr.Harika lala, General Dental Surgeons, India, for their intellectual contribution and support.

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