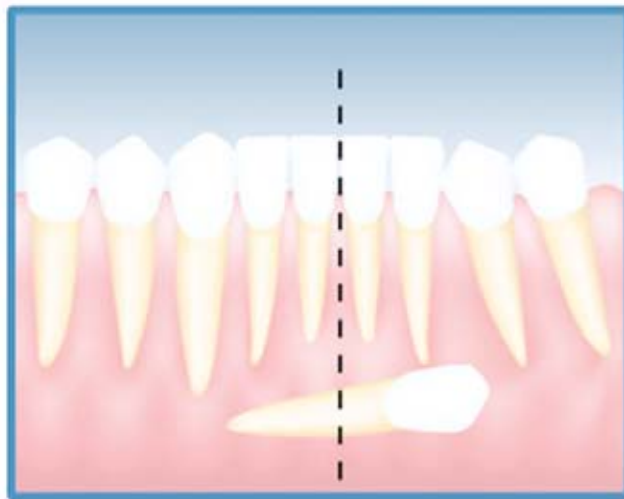


Transmigration of Mandibular Canines: A Report of Six Cases and a Review of the Literature

Pinar Sumer, DDS, PhD; Mahmut Sumer, DDS, PhD;
Bora Ozden, DDS, PhD; Feyza Otan, DDS



Abstract

Background: The transmigration of a mandibular canine is a rare phenomenon, the etiology of which is not clear. The literature on this rare condition is reviewed, and six cases of transmigrated mandibular canines are presented.

Report: Panoramic radiographic examination of six patients revealed each patient had one impacted transmigrated mandibular canine. Of the six impacted teeth, the left mandibular canine was involved in four instances and the right in two. In one case the transmigrated canine was associated with a dentigerous cyst.

Summary: Transmigration of the mandibular canine is a rare event, and early radiographic examination of the patient is important for treatment. In addition, future studies may lead to a better understanding of this rare anomaly and improvement of the classification criteria.

Keywords: Canines, transmigration, tooth impaction, tooth migration

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Introduction

Transmigration is the movement of an impacted tooth through the midline. The movement of an unerupted tooth across the dental midline is unusual and worthy of investigation. Mandibular canines are rarely found in a horizontal position in the mandible, and their transmigration is a very rare phenomenon.¹⁻² According to Javid,³ an impacted mandibular canine that has crossed the midline more than half of its length should be considered as transmigrated. However, Joshi¹ felt the tendency of a canine to cross the barrier of the mandibular midline suture is a more important consideration than the distance of migration after crossing the midline.

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 canines is more rare than maxillary canines, and it is an even more rare phenomenon when such an impacted mandibular canine migrates to the other side of the mandible, crossing the mandibular midline.¹ The purpose of this article is to report six cases of transmigrated mandibular canines and to review the literature.

Case Reports

Case 1

A 28-year-old man complained about the appearance of his retained mandibular right and left primary canines. Radiographic examination

revealed both mandibular permanent canines to be impacted. Although the right mandibular canine was unerupted it was in a favorable position. The unerupted left mandibular canine crossed the midline and transmigrated to the right side (Figure 1).

Case 2

A 22-year-old woman was referred to the oral surgeon for removal of impacted maxillary third molars. The panoramic radiograph revealed the left mandibular canine was impacted horizontally and its root crossed the midline (Figure 2).

Case 3

A 54-year-old man was referred for construction of prosthesis. The panoramic radiograph indicated the mandibular right canine was impacted mesioangularly with part of the crown crossing the midline. The crown of this canine was surrounded by a dentigerous cyst (Figure 3).

Case 4

A 14-year-old boy was referred for his retained mandibular left primary canine. The panoramic radiograph indicated the mandibular left canine was impacted between the central and lateral incisors. The mandibular central incisor was forced mesially with the midline shifted to the right side of the mandible. In addition, a dilaceration of the lateral incisor root was observed as a result of the left impacted canine (Figure 4).

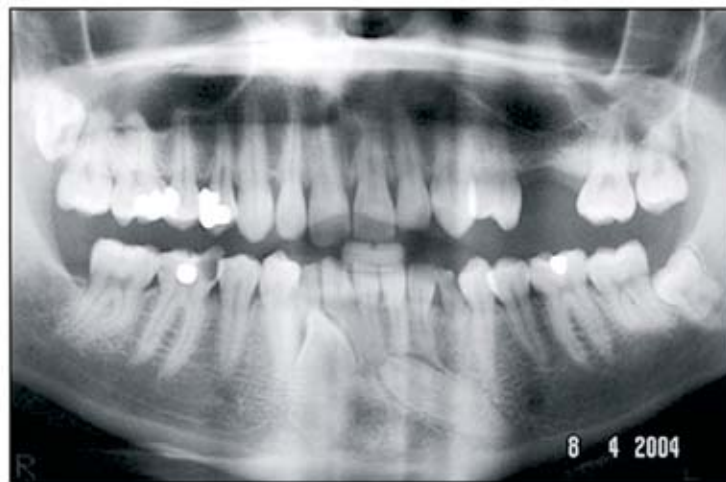


Figure 1. Case 1: The mandibular right canine is in a favorable position and the left canine has crossed the midline.

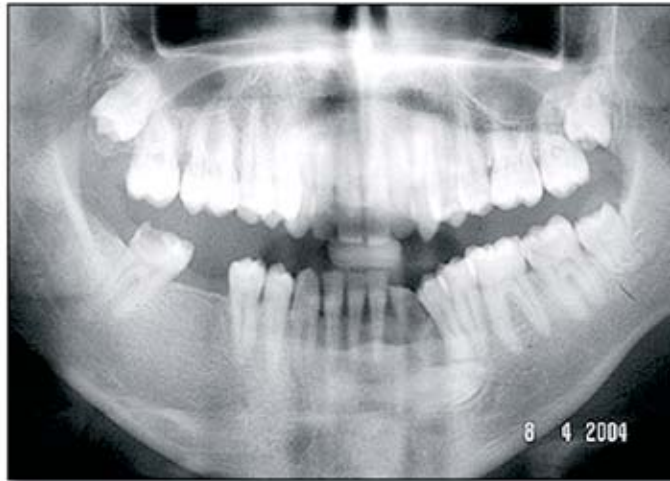


Figure 2. Case 2: The mandibular left canine is lying horizontally and its root has crossed the midline.

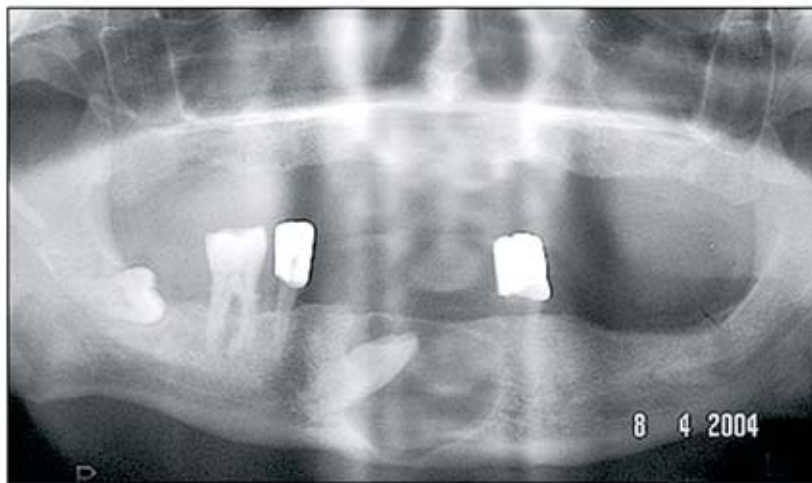


Figure 3. Case 3: The mandibular right canine is in a mesioangular position with part of the crown crossing the midline and surrounded by a dentigerous cyst.

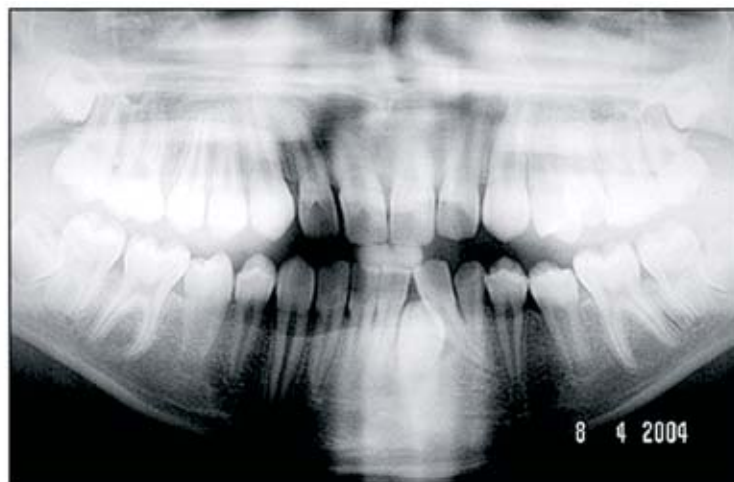


Figure 4. Case 4: The mandibular left canine is impacted between the central and lateral incisors forcing the central incisor mesially and shifting the midline to the right side of the mandible.

Case 5

A 23-year-old woman was referred for periodontal treatment. Radiographic examination revealed a horizontally impacted right canine tooth migrated across the midline located below the apices of premolar teeth within the mandible (Figure 5).

Case 6

A 13-year-old boy was referred for evaluation of his retained mandibular left primary canine. Panoramic examination revealed a horizontally impacted left mandibular canine tooth had migrated across the midline located below the apices of the incisors (Figure 6).

Discussion

Migration of mandibular canines across the midline is referred to as 'transmigration.' This is a rare phenomenon as described in a review of the literature¹⁻⁵⁴ which reported only 154 cases (Table1). Most of the subsequent reports have described single cases. Transmigration of an unerupted tooth is generally a unilateral phenomenon, although 16 cases of bilateral transmigration have been reported.^{1,52} Joshi¹ observed four cases of bilateral transmigration among a collection of 28 cases. The left canine is more involved than the right canine.^{1,51} In four of six patients in the present report the left canines



Figure 5. Case 5: A horizontally impacted mandibular right canine located below the apices of left premolar teeth that crossed the midline.

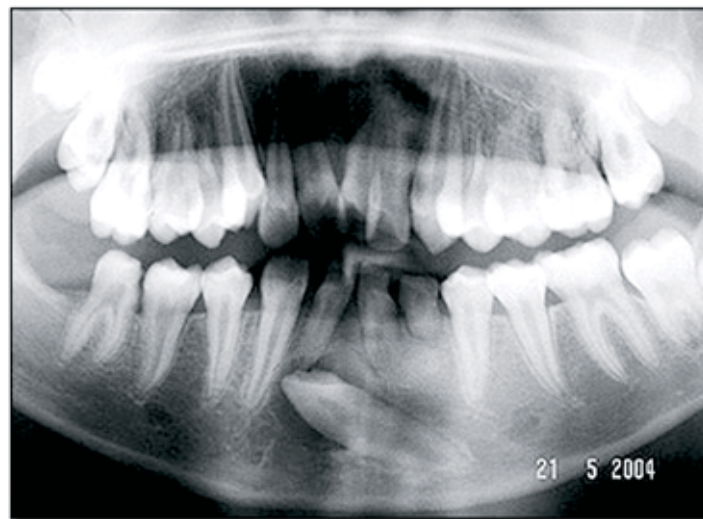


Figure 6. Case 6: Horizontally impacted mandibular left canine crossing the midline located below the apices of the incisors.

Table 1. Chronological listing of transmigratory mandibular canines observed by different authors.

Author	Year	No. Cases	Sex-Age
Bluestone	1951	2	NA
Thoma	1952	1	NA
Caldwell	1955	1	F-31
Bruszt	1958	2	F,M-NA
Stafne	1963	1	NA
Ando et al	1964	1	M-8
Kaufman et al	1967	1	F-19
Fiedler & Alling	1968	1	F-16
Pratt	1969	1	M-19
Pindborg	1970	2	M(2)-15
Tarsitano et al	1971	3	NA
Heiman & Biven	1973	1	F-30
Wechsler	1973	1	F-12
Black & Zallen	1973	1	M-23
Miranti & Levborg	1974	1	F-17
Greenberg & Orlian	1976	1	M-8
Howard	1976	8	M(2)12-13, F(6)11-20
Barnett	1977	1	F-24
Cowmann & Wootton	1979	1	M-16
Abbot et al	1980	1	F-62
Hebda & Underwood	1980	1	M-21
Zvolanek et al	1981	1	M-31
Joshi et al	1982	1	M-19
Shapira et al	1982	3	F(2)9-13, M(1)-11
Kerr	1982	1	F-9
Sofat	1983	1	M-20
O'Carrol	1984	1	F-28
Nashashibi & Abu Shalhoub	1984	2	M(2)19-24
Barsley & Cade	1984	1	F-24
Vaskova & Markova	1984	1	NA-14
Javid	1985	13	F(8)13-52, M(5)17-33
Jalili	1986	1	M-16
Zvolanek	1986	1	F-25
Dhooira et al	1986	3	F(1)17, M(2)19-22
Gadgil	1986	1	M-26
Mehta et al	1986	1	F-19
Broadway	1987	1	F-15
Gadalla	1987	1	F-22
Ripari et al	1988	1	M-9
Vichi & Franchi	1991	15	F(11)10-42, M(4)9-13

Table 1. Continued

Shanmuhsuntharam & Boon	1991	2	F-20, M-52
Mitchell	1993	1	M-13
Brezniak et al	1993	1	F-19
Joshi & Shetye	1994	2	F(2)14
Joshi	2001	28	F(18)9-23, M(10)11-22
Mupparapu	2002	9	F(7)17-38, M(2)20-69
Camilleri	2003	5	NA
Aydin & Yilmaz	2003	3	F(1)17, M(2)10-24
Present Study	2004	6	M(4)13-14-54, F(2)22-23

F: Females; M: Males; NA: Not Available

were involved. The incidence of transmigrated canines is much higher in females than in males. In the literature, transmigrated canines have been reported in 87 females and 57 males. Gender was not mentioned in ten of the cases.

A specific etiology of this anomaly is not known, but traumatic factors, heredity, the long eruption path of canine tooth germs, premature loss of primary teeth, filling of this space by an adjacent tooth, disharmony of tooth-size, unfavorable alveolar arch length, and over length of crowns can be the causative factors.^{1,51,53} Odontomas are also suggested as a possible etiological factor.³⁰ A permanent canine within a dentigerous cyst may transmigrate due to the cystic pressure. In one of the present patients, the transmigrated canine was associated with a dentigerous cyst. However, it may not be possible to determine whether the tooth was transmigrated before the pathological process developed or not.

Mupparapu⁵² used five criteria to classify the transmigrated canines. These are summarized as follows:

- **Type 1:** The canine is impacted mesioangularly across the midline, labial, or lingual to the anterior teeth with the crown portion of the tooth crossing the midline.
- **Type 2:** The canine is horizontally impacted near the inferior border of the mandible below the apices of the incisors.
- **Type 3:** The canine has erupted either mesial or distal to the opposite canine.
- **Type 4:** The canine is horizontally impacted near the inferior border of the mandible

below the apices of either premolars or molars on the opposite side.

- **Type 5:** The canine is positioned vertically in the midline with the long axis of the tooth crossing the midline.

Most of the cases reported in the literature are Type 1.⁵² Of the six cases in the present report, two canines exhibited a Type 1 transmigratory pattern, two canines exhibited Type 2, and one each of Types 4 and 5. In the present study, one canine was impacted horizontally below the apices of the incisors with the root portion of the tooth crossing the midline (Type 2) which was contrary to the majority of Type 2 transmigrated canines that have the crown portion of the tooth crossing the midline.

Howard¹ expected the older patient would show a greater distance of travel because a longer time had been available for the migratory canine to travel. Ando and coworkers⁹ observed transmigration in their patient for six years. During this time, the canine moved from its original position to a place near the mental foramen on the opposite side. Out of five cases according to Al-Waheidi,⁵⁰ one case exhibited mandibular canines in a favorable position while two and half years later these teeth were found to be mesially inclined, and the unerupted mandibular left canine had crossed the midline. These cases emphasized the importance of early radiographic examination of these patients.

In the present study the average patient age was 32 except for cases four and six. In these patients obtaining a panoramic radiograph before

treatment may reveal impacted mandibular canines in a favorable position and make the treatment more effective and less complicated. Once the transmigration process is definitely established, the only treatment possible is surgical extraction.¹

Summary

Transmigration of the mandibular canine is a rare event, and early radiographic examination of a patient is important for treatment planning. Future studies may lead to a better understanding of this rare anomaly and improvement of the classification criteria.

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About the Authors

Pinar Sumer, DDS, PhD



Dr. Sumer is an Assistant Professor in the Department of Oral Diagnosis and Radiology of the Faculty of Dentistry at Ondokuz Mayıs University in Samsun, Turkey. She is a graduate of the University of Hacettepe Faculty of Dentistry in Ankara, Turkey. She received her PhD degree from the Faculty of Dentistry at Selcuk University in Konya, Turkey.

e-mail: psumer1970@yahoo.com

Mahmut Sumer, DDS, PhD



Dr. Sumer is an Assistant Professor in the Department of Oral and Maxillofacial Surgery of the Faculty of Dentistry at Ondokuz Mayıs University in Samsun, Turkey. He is a graduate of the University of Hacettepe Faculty of Dentistry in Ankara, Turkey. He received his PhD degree from Selcuk University Faculty of Dentistry in Konya, Turkey.

e-mail: msumer1970@yahoo.com

Bora Ozden, DDS, PhD



Dr. Ozden is a Research Assistant in the Department of Oral and Maxillofacial Surgery of the Faculty of Dentistry at Ondokuz Mayıs University in Samsun, Turkey. He is a graduate of the University of Ankara Faculty of Dentistry in Ankara Turkey. He received his PhD degree from Ondokuz Mayıs University Faculty of Dentistry in 2005.

e-mail: bora_ozdendt@yahoo.com

Feyza Otan, DDS



Dr. Otan is a Research Assistant in the Department of Periodontology of the Faculty of Dentistry at Ondokuz Mayıs University in Samsun, Turkey. She is a graduate of the University of Ankara Faculty of Dentistry in Ankara, Turkey.

e-mail: feyza_otan@yahoo.com