

Transmigration Of Mandibular Canine – A Review Of Literature And A Case Report

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ABSTRACT

Transmigration of the mandibular permanent canine is a rare event, though reports have increased with the advent of panoramic radiography. Ectopic eruption of canines and other dental anomalies as retained deciduous teeth and supernumerary teeth have a genetic etiology and may be linked. We report the clinical case of a twenty eight-year-old patient presenting transmigration of the lower right canine. The classification is discussed along with treatment modalities, diagnosis and clinical features of transmigration.

KEY WORDS: Canine; Mandibular; Transmigration; Mupparapu Classification

INTRODUCTION

Impacted permanent canines are relatively common and have been documented extensively in the literature. Mandibular canine impaction occurs approximately 20 times less frequently than maxillary canine impaction.¹ In 1971, Tarsitano and colleagues defined "transmigration" as the displacement and migration of an impacted tooth across the midline to the opposite side of the jaw.² Later, Javid³ modified the definition to include cases in which more than half of the tooth had passed through the midline. In 2006, Auluck and colleagues⁴ suggested that the actual distance of canine migration across the mandibular midline is less important than the tendency of the canine to cross the midline.

The etiology is unknown, though several mechanisms have been proposed. Tumors, cysts, and odontomes may cause malposition of teeth if they lie in the path of eruption of teeth. Other possible etiologic factors

suggested by some authors are premature loss of deciduous teeth, retention of the deciduous canine, crowding, spacing, supernumerary teeth, excessive length of the crown of the mandibular canines, cystic lesions, and an abnormally strong eruption force.^{5-7,3,8,9}

We report a clinical case of transmigration of mandibular canine.

CASE REPORT

A 28-year-old male was referred to the department of orthodontics and dentofacial orthopedics, Institute of Dental Studies and Technologies, Modinagar, for orthodontic consultation and treatment. His medical history was non-contributory. On intraoral examination, the clinician noted Class II incisor relation with mild crowding in the lower right premolar/canine area, absence of lower left permanent canine with 3mm spacing between left lateral incisor and first premolar and a mild crowding in upper arch. (Figure 1).

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Figure 1 : Intraoral Photograph

A panoramic radiograph revealed a transmigrated lower left canine in a position of horizontal impaction below the apices of the lower contralateral premolars and canines. This was classified as a Type IV pattern of transmigration (classification by Mupparapu).¹⁰ (Figure 2, 3). Subsequently CBCT was taken to locate the exact location of transmigrant lower left canine in relation to adjacent teeth. (Figure 4)



Figure 2 Lateral Cephalogram of the case showing transmigrated lower left canine



Figure 3 OPG of the case showing transmigrated lower left canine (Type IV pattern)



Figure 4 CBCT of the case showing transmigrated lower left canine

The phenomenon of transmigration and treatment options were explained to the patient and parents. Because of the severity of the displaced impacted canine, it was decided to extract the transmigrated canine. The surgical removal of the transmigrated canine was performed under local anaesthesia. The patient will subsequently undergo orthodontic treatment.

DISCUSSION

Transmigration is an extremely rare anomaly. The mandibular permanent canine is the only tooth in the dental arch reported to migrate across the symphyseal midline to the contralateral side. In doing so, the tooth usually travels along the labial side of the incisor roots. It has been found to migrate as far as the roots of the first molar on the opposite side.¹¹

Clinically, transmigration can be, and usually is symptomless. Although the first published cases were detected as a result of neurological changes caused by the compression of the lower dental nerve by the impacted tooth¹², radiology has made it possible to detect other

similar, but symptomless, cases, allowing an adequate assessment of the percentage of cases which are presented clinically.

Transmigrated teeth are often only diagnosed following routine radiographic examination prior to orthodontic treatment. (Table 1) The typical features seen on evaluation of the orthopantomograms are excessive mesial inclination of the unerupted mandibular canine associated with factors including proclination of the lower anterior teeth and an enlarged symphyseal cross-section area of the chin. It is recommended that, should suspicions arise, the patient is reviewed regularly.¹³⁻¹⁶

Type	Author (Year)/Number of cases (if more than 1)
Miscellaneous	Bluestone ²² (1951)/2, Pindborg ²³ (1970)/2, Wechsler ²⁴ (1973), Javid ³ (1985)/7.
Type I	Howard ²⁰ (1976)/5, Barnett ²⁵ (1977), Abbot ¹⁹ et al (1980), Zvolanek ²⁶ et al (1981), Shapira ⁶ et al (1982)/2, Kerr ²⁷ (1982), Vascova ²⁸ et al (1984), Barsley ²⁹ (1984), Nashashibi ³⁰ et al (1984), Javid ³ (1985)/3, Zvolanek ³¹ (1986), Dhooria ³² et al (1986)/2, Vichi Franchi ³³ (1991)/11, Shanmuhasuntharam and Boon ³⁴ (1991), Mitchell ³⁵ (1993), Joshi ⁸ et al (1994), Wertz ³⁶ (1994)/4, Kharbanda and Choudhury ³⁷ (1994), Al Waheidi ⁹ (1996), Joshi ¹³ (2001)/10, Dhawan P ³⁸ et al. (2001), Mupparapu ¹⁰ (2002)/2, Aydin U & Yilmaz HH ³⁹ (2003), Camilleri S & Scerri E ⁴⁰ (2003), Rebellato J and Schabel B ⁴¹ (2003), Aydin U ¹ et al (2004)/7, Sumer P ⁴² et al (2007)/6, Aktan AM ⁴³ et al (2008)/4, Raffat A and Ijaz A ⁴⁴ (2009)/1,
Type II	Bruszt ¹² (1958)/2, Stafne ⁴⁵ (1963), Tarsitano ² et al (1971)/2, Greenberg and Orlian ⁴⁶ (1976), Howard ²⁰ (1976), Shapira ⁶ et al (1982), O'Carroll ⁴⁷ (1984), Gadalla ⁴⁸ (1987), Ripari ⁴⁹ et al (1988), Vichi Franchi ³³ (1991), Al -Waheidi ⁹ (1996)/2, Costello ⁵⁰ et al (1996), Alaejos -Algarra ⁵¹ et al (1998)/3, Joshi ¹³ (2001)/3, Mupparapu ¹⁰ (2002), Aydin U & Yilmaz HH ³⁹ (2003)/2, Batra P ⁵² et al (2003), Sanu OO, Ogunlewe MO ⁵³ (2003), Aydin U ¹ et al (2004), Auluck A ⁴ et al (2006)/4, Sumer P ⁴² et al (2007)/6, Camilleri ⁵⁴ (2007)/1, González-Sánchez MA ⁵⁵ et al (2007)/15, Batra P and Leyland L ⁵⁶ (2008)/2, Trakyali G ⁵⁷ et al (2010)/1, Dharma RM ⁵⁸ et al (2010)/1, Yadav R ⁵⁹ et al (2012)/1.
Type III	Kaufman ⁶⁰ et al (1967), Pratt ⁶¹ (1969), Heiman ⁶² (1973), Black and Zallen ⁶³ (1973), Hebda ⁶⁴ et al (1980), Broadway ⁶⁵ (1987), Vichi Franchi ³³ (1991), Brezniak ⁶⁶ (1993), Kharbanda and Choudhury ³⁷ (1994), Joshi ¹³ (2001)/9, Mupparapu ¹⁰ (2002).
Type IV	Thoma ²¹ (1952), Caldwell ¹¹ (1955), Ando ⁵ et al (1964), Fiedler and Alling ⁶⁷ (1968), Tarsitano ² et al (1971), Miranti and Levbarg ⁷ (1974), Howard ²⁰ (1976)/2, Nashashibi ³⁰ et al (1984), Dhooria ³² et al (1986)/2, Vichi Franchi ³³ (1991)/2, Shanmuhasuntharam and Boon ³⁴ (1991), Joshi ⁸ et al (1994), Costello ⁶⁸ et al (1996), Alaejos-Algarra ⁵¹ et al (1998)/2, Joshi ¹³ (2001)/2, Mupparapu ¹⁰ (2002), Auluck A ⁴ et al (2006)/4, Torres Lagares D ⁶⁹ et al (2006)/1, González-Sánchez MA ⁵⁵ et al (2007)/15, Sumer P ⁴² et al (2007)/6, Aktan AM ⁴³ et al (2008)/4, Vuchkova J and Farah CS ⁷⁰ (2010)/4, Nagaraj T and Umashree N ⁷¹ (2011)/1.
Type V	Sofat ⁷² (1983), Mupparapu ¹⁰ (2002)/3, Auluck A ⁴ et al (2006)/4, Aktan AM ⁴³ et al (2008)/4, Batra P and Leyland L ⁵⁶ (2008)/2, Vuchkova J and Farah CS ⁷⁰ (2010)/4, Gunashekhar M and Rohini M ⁷³ (2011)/1, Kumar JS ⁷⁴ (2012)/1.

The presence of pathological conditions with transmigration must also be mentioned. Such displacement may occur spontaneously or as a result of a localized pathologic lesion, such as an odontoma or a dentigerous cyst.⁶ A genetic etiology has also been proposed.¹⁷

From the data published, it is possible to define various behavioural patterns of the transmigrated mandibular canines. In particular, Mupparapu¹⁰ described five patterns. Pattern 4 corresponds to our case (canine impacted horizontally below the apices of the contralateral canine and premolars). Type 1 is a canine which is in a mesioangular position below the front teeth with its corona crossing the midline. Type 2 is similar to type 4 except that the canine is located below the apices of the lower incisors. Type 3 is an erupted canine caused by the contralateral canine moving mesially or distally. Finally, type 5 is a canine in a vertical position coinciding with the midline. Mupparapu's type 1, followed by type 2, is the most frequently occurring pattern. Type 4 and 3 occur less frequently, while type 5 is the least frequent.¹⁰

Treatment options to prevent impaction of the permanent canine that have been suggested include extraction of deciduous canines and surgical exposure of the permanent canine.¹² If the canine is impacted, it is important to take into account whether the case is to be treated as an extraction or nonextraction orthodontic case. Observation, exposure¹⁸ and orthodontic alignment,¹⁹ transplantation,²⁰ and extraction²¹ are all possible treatment options, though extraction is the most popular. In a nonextraction orthodontic case, surgical repositioning can be attempted prior to surgical extraction.¹¹ It is more favourable to extract the canine surgically in an extraction

orthodontic case.³ This is especially the case if the tip of the crown has migrated beyond the adjacent lateral incisor root apex, as it would be mechanically impossible to align the aberrant canine into its normal position.²⁰

CONCLUSION

Migration of the mandibular canine through the mandibular midline is infrequent and normally asymptomatic. Even under clinical and radiologic scrutiny, certain dental anomalies may not be detected. The diagnosis of transmigrant canines is based on the absence of the permanent canine in the arch and on the radiologic findings in both intraoral and panoramic radiographs. The case presented here-transmigration of the mandibular canine-illustrates the value of this approach.

Surgical extraction is the treatment of choice in patients with transmigrant canines and associated pathology. However, in view of the risk of damaging important anatomical structures when surgery is performed, the management of asymptomatic impaction may be limited to periodic clinical and radiological follow-up visits. Failure to detect such teeth, however, could lead to serious damage to adjacent teeth and surrounding bone.

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