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Transmigration And Ectopic Eruption of A Mandibular Canine: A Review and Case Report.

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Abstract

Transmigration is a rare phenomenon in canines, it is however rarer for a transmigrant canine to avoid impaction. From the orthodontic perspective, the above case could be described as a unique yet uncomplicated one. The occlusal, aesthetic and functional discrepancies and effects of the transmigration do not warrant great treatment need nor prolonged orthodontic treatment.

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Introduction

Unerupted teeth have been reported to migrate from their original positions and predispose to malocclusion. However, these changes in position are usually restricted to the same quadrant of the dental arch; the only exception being the canine which is the only tooth to have been reported to migrate across the midline[1]. The term 'transmigration' was first used by Ando et al in 1971 to describe the movement of an unerupted mandibular canine across the midline[2-4]. This definition was modified by Javid[5] to include cases where more than half of the mandibular canine had crossed the midline. The first reported case of transmigration involving any other tooth apart from the mandibular canine was presented by Aydin and Yilmaz[6] in 2003 when they reported a case of transmigration of a left maxillary impacted canine. Before this, transmigration had only been reported in the mandible. Pre-eruptive migration of a tooth across the midline by more than half its length would therefore appear to be a more accurate definition of transmigration[6-8].

The actual movement of the mandibular canines across the midline may be challenging to positively prove in many cases due to late or adult presentation, however, there have been cases where evidence has shown this to have occurred. Tarsitano et al[2] reported cases of transmigration of mandibular canines where there was an attempt at extraction following inferior alveolar nerve blocks to the located sides of the transmigrated canines. The authors reported that pain was produced until inferior alveolar nerve blocks were administered in the contralateral side where the canines originated showing evidence of contralateral innervation of the transmigrant canines. More convincing evidence was provided by Ando et al[9] who in 1964 reported a case of transmigration of an unerupted mandibular canine in a school boy after radiological monitoring with serial radiographs over 8 years which showed the migration of the canine from the left body of the mandible across the symphysis to a final position beneath the right mental foramen. According to Wertz[3], three important criteria of transmigration may include a missing contralateral canine, contralateral nerve supply and the transmigrated tooth being a mirror image of its contralateral counterpart.

ORIGINAL ARTICLE

Transmigration is a rare occurrence with only 137 reported cases in the literature as of the beginning of the 21st century.[6] The incidence of transmigration has been reported to have a range of 0.1% to 0.31% compared with an incidence range of 0.92% to 5.1% for mandibular canine impaction[7]. The majority of transmigrated canines remain impacted however eruption of these teeth in their new sites have been reported mostly erupting labially or buccally and occasionally they have been found to erupt in the line of the arch in between incisors or as supplemental canines[1]. The introduction of the orthopantomograph radiograph as a routine screening tool in dentistry has contributed to the increased diagnosis and reporting of cases of transmigration and indeed other asymptomatic dento-skeletal anomalies[1]

Of the 117 transmigrant mandibular canines studied in the work of Joshi[10], approximately 9% occurred bilaterally while the left mandibular canine showed a slightly higher incidence of transmigration with about 57%. There was also a higher incidence (65%) reported among females. The majority of the transmigrant mandibular canines reviewed in the study remained impacted (89%) with only 11% erupting. Of the erupted transmigrant mandibular canines which were 12 in number, seven erupted labially, three erupted on the dental arch and one erupted in a lingual position. There was one case of extra-oral eruption of an inverted transmigrant canine through the right side of the chin[10].

Mupparapu[11] described 5 different patterns of transmigration based on the inclination of the long axis of the canine, the relationship of the canine crown with the midline, adjacent teeth and the contralateral erupted canine at the time of diagnosis. Type 1 pattern was found to be most common (45.6%) where the canine was positioned mesio-angularly across the midline labial or lingual to the incisors within the jawbone; type 2 pattern presented with a horizontally lying impacted canine below the apices of the incisors in 20% of studied cases; type 3 pattern occurred in 17% of cases where the transmigrant canines erupted either mesial or distal to the contralateral canine; type 4 patterns which had the transmigrant canines impacted horizontally beneath the apices of contralateral premolars or molars occurred in 14% of cases while type 5 was the least common (1.5%) and had the transmigrant canine vertically positioned in the midline with the long axis crossing the midline irrespective of eruption status[11].
The most common treatment of transmigrant canines is extraction which may frequently require a trans-alveolar approach due to impaction or ectopic location[3]. Following extraction, orthodontic correction of midline discrepancies and/or spacing can be carried out for improved aesthetics and intercuspation.
We present a case of transmigration with the ectopic eruption of a right mandibular permanent canine as a supplemental tooth in the left mandibular quadrant.

Case Report
A case is described of a 24-year-old lady who presented to the orthodontic clinic due to aesthetic concerns as a result of an extra tooth in the lower left anterior region which had erupted 3 years earlier. There was no history of previous dental extractions, neither was there a history of systemic illness or conditions of any known kind and she was found to be fit on general physical examination.
Extra-oral examination revealed a convex profile with a class 1 skeletal relationship and a transversely symmetrical face with competent lips (Fig. 1).
On intra-oral examination, there were no gross soft tissue abnormalities and the maxillary arch had a full complement of dentition. The mandible presented with bilateral mandibular tori and an asymmetric dental arch. The right mandibular quadrant showed the absence of the canine while the left mandibular quadrant displayed severe crowding as a result of a supernumerary canine located labial to the left mandibular lateral incisor and mesial to the left mandibular canine. The cusp tip of the supplemental canine was just below the level of the mid-cervical area of the left mandibular lateral incisor (Fig. 1).

Other occlusal features include mild spacing in the right mandibular quadrant (2mm distal to the right mandibular lateral incisor) lingual displacement and mesio-lingual rotation of the left mandibular second premolar and mild crowding of the maxillary anterior segment with disto-labially rotated central incisors. Inter-arch relationships include bilateral Angle's

class I molar relationship and class II incisal relationship (overjet of 8mm measured at the distal aspect of the upper central incisors), deep bite and a 3mm lower midline shift to the right (Fig. 1).
Radiological investigations confirmed the anatomical resemblance of the supernumerary tooth to a canine tooth on a periapical radiograph (Fig. 3) and the absence of a canine in the right mandibular quadrant on an orthopantomograph (Fig. 2).

A treatment plan of extraction of the transmigrant mandibular canine followed by fixed orthodontic appliance treatment for correction of intra-arch and inter-arch discrepancies was proposed.

Records and investigations

Fig. 1 Photographs (facial, intra-oral)

Fig. 2 Panoramic radiograph

Fig. 3 Periapical radiograph

Discussion

The clinical diagnosis of transmigrant mandibular right canine made in this case is based on the clinical and radiological evidence of a missing canine in the right mandibular quadrant and the presence of an erupted supernumerary canine in the left mandibular quadrant. In the absence of conclusive evidence of actual movement of a mandibular canine from one quadrant to the adjacent, the absence of a contralateral canine, mirror image presentation of two canines in the same quadrant and the demonstration of contralateral nerve supply were the 3 criteria were proposed by Wertz[3] to prove transmigration. In this case, the mandibular right canine is absent however the two canines in the left quadrant appear to be identical images and not mirror images of each other (Fig. 1). The presence of contralateral innervation in this case unfortunately can only be investigated at the time of extraction of the transmigrant canine.

This case of transmigration in a female patient involving the right mandibular canine is consistent with the reports of Buyukkurt[4] and Joshi[10] on the higher incidence of transmigration among female patients however this may be due to the higher proportion of females among orthodontic patients. Joshi[10] however found the left mandibular canine more frequently transmigrant (occurring in 57% of reported cases) contrary to our finding in this case.
Among mandibular canines, transmigration was found to occur about 9-16 times less frequently than impaction and only less than 20% of transmigrant mandibular canines managed to erupt[7]. In this case, the transmigrant right mandibular canine has erupted in a position mesio-labial to the left mandibular canine. This corresponds to a type-3 pattern of transmigration according to Mupparapu[12] which described a transmigrant canine that has erupted into the oral cavity in a position mesial or distal to the contralateral canine. This pattern was reported to be the most common among transmigrant canines which erupted into the oral cavity[11, 12]. The transmigrant mandibular canines when they manage to erupt, have also been found mostly in labial positions on the dental arch (58%), with only about 8% incidence of lingual eruption[10].

Conclusion

Transmigration is a rare phenomenon frequently necessitating significantly invasive and complicated surgical intervention because a majority of transmigrant canines remain impacted in ectopic positions often closely related to roots and apices of other teeth. In the reported case, the unlikely event of an eruption of the transmigrant canine without significant aesthetic and functional occlusal challenges has made this unique case straightforward and uncomplicated in terms of treatment.

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