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## Unusual mandibular canine transmigration: A case report

**Abdoul Hafizou Rabe<sup>1\*</sup>, Yosra Tabchi<sup>2</sup>, Fatima Zaoui<sup>3</sup>, Mohamed Faouzi Azaroual<sup>4</sup>**

<sup>1-2</sup> Resident Dentist in Dentofacial Orthopedics, Mohammed V University of Rabat, Faculty of Dentistry-Rabat, Mohammed El Jazouli, Madinat Al Irfane, Rabat, Morocco

<sup>3-4</sup> Professor of higher education in dentofacial orthopedics, Mohammed V University of Rabat, Faculty of Dentistry Rabat, Morocco

\* Corresponding Author: **Abdoul Hafizou Rabe**

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### Abstract

The main aim of the present study is to present a rare case of mandibular canine transmigration in a young Moroccan patient.

The authors report one rare case of a young male patient diagnosed with mandibular canine transmigration at fifteen years old. Clinical examination of the patient revealed a type 5 transmigration according to Mupparapu's classification. Early detection of this anomaly can help preserve these canines by orthodontic intervention or surgical transplantation. This developmental anomaly is diagnosed by radiographic evaluation, which is primarily based on the panoramic radiograph.

Orthodontic treatment with correction of transmigration of 33 by substituting it for 31 and 32 for 33 was proposed.

This paper discusses the importance of early diagnosis of canine transmigration in treatment planning and reviews the various possible treatment options.

**Keywords:** transmigration, mandibular canine, transposition

### Introduction

Dental transposition is defined as the exchange of position of two adjacent teeth, especially roots, or the development or eruption of a tooth into a position usually occupied by a non-adjacent tooth (Peck *et al.*, 1998)<sup>[9]</sup>. It is a type of ectopic eruption that results in an abnormal formula of permanent teeth on the dental arch (Venkataraghavan *et al*, 2014)<sup>[14]</sup>. Canine transposition affects both males and females with a higher frequency of involvement of the maxillary canine (DI Venere *et al*, 2017)<sup>[4]</sup>.

Unilateral dental transpositions have been found much more frequently than bilateral transpositions, and the left side is more victimized than the right side (Abu-Hussein *et al*, 2015; Peck *et al*, 1993)<sup>[1, 8]</sup>.

A complete transposition is defined when the tooth concerned changes its location in the arch in a parallel manner. In the case of an incomplete transposition, called "partial transposition" the crowns change position while the roots stay in their ideal place. It is also possible to find the canine crowns in the perfect position while their roots change locations (Rupprech *et al*, 1985; Chattopadhyay *et al*, 1996)<sup>[10, 3]</sup>.

As for transmigration, it is a rare phenomenon in which teeth perform an intraosseous migration across the midline. Tooth transmigration is almost exclusively reported in mandibular canines. The prevalence of this phenomenon in an orthodontic population is reported to be 0.079% for mandibular canines, 0.0017% for mandibular lateral teeth, and 0.0026% for mandibular premolars. It is also more frequent in females than in males with a de ratio of 1.6:1. The left side of the mandible is more often affected than the right side. The etiology remains poorly understood to this day. However, heredity, mandibular trauma at a very early age, or an obstacle such as a root fragment or the presence of a cyst may be sufficient to divert such a tooth to another site (Bhullar *et al*, 2017)<sup>[2]</sup>.

In 2000 s, a new classification regarding transmigration emerged and was distributed as follows (Mupparapu *et al*, 2002)<sup>[7]</sup>.

Type1: Canine positioned mesioangular on the midline inside the maxillary or mandibular bone, external or internal of the incisors, protruding from the midline.

Type 2: Horizontal inclusion of the tooth near the lower edge of the mandibular bone under the anterior teeth.

Type 3: Canine eruption in front or behind the contralateral canine.

Type 4: Horizontal inclusion of the tooth near the lower edge of the mandibular bone under the contralateral posterior teeth.

Type 5: the vertical eruption of the tooth in the midline

This article aimed to publish the first Moroccan case about mandibular canine transmigration of a young Moroccan patient.

## Case Report

### History

A 15-year-old male patient was referred to the orthodontic department of the Rabat Center for Dental Consultation and Treatment (CCTD-Rabat) because of transmigration of the permanent left mandibular canine at the site of the mandibular central incisor. He was in good health general health with no family or medical history.

### Assessment

The extraoral examination showed a convex profile with a deep mentolabial sulcus and slightly closed nasolabial angle, an unattractive smile (Figure 1).



**Fig 1:** Pretreatment facial photographs

Clinical examination showed that the patient's oral hygiene was average, and the periodontal of the canine was weak, with the presence of lingual ankylosis (Figure 2).



**Fig 2:** Pretreatment intraoral photographs

The intraoral examination revealed in the maxilla the presence of riziform lateral incisors with a palatal position of 22, and caries on 17 and 26 (Figure 2).

There was in the mandibular arch, a lingual position of 42, mesiolingual rotation of 31 and 41, the presence of 73, and transmigration of 33 to the site of 31.

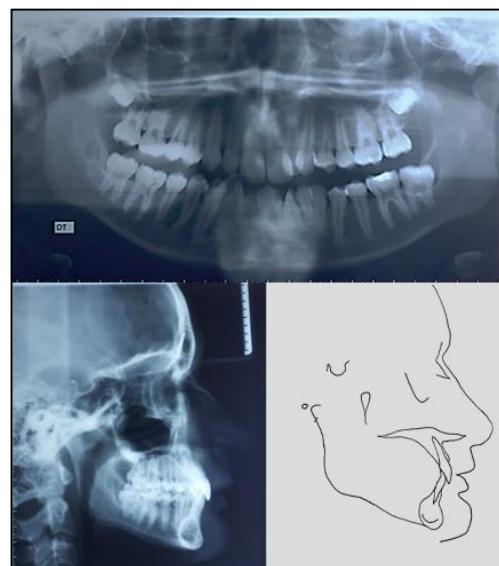
The inter-arch relationships were a Class II Division 2 subdivision left malocclusion (Figure 3).

Cephalometric examination revealed a skeletal Class I relationship with mandible and maxillary protrusion, a hypodivergent skeletal pattern profile (Table 1).

**Table 1:** Pretreatment cephalometric measurements

SNA	82±2	86°
SNB	80±2	84°
ANB	2±2	2°
AoBo	0±2	-5 mm
I to NA	22°±2	17°
I to NA	4	4mm
i to NB	25°±2	20°
i to NB	4	4 mm
I to i	131°	141°
Pog to NB		1mm
GoGn-SN	32±5	25°

Panoramic (Figure 3) and periapical (Figure 4) radiographs of the affected area were realized. Radiographic examination confirmed the presence of a complete type of transposition between 31 and 33.



**Fig 3:** Pretreatment radiographs and cephalometric

Fixed orthodontic appliances therapy was scheduled for correction of the malocclusion. At the onset of treatment, the 73 was removed, followed by a lingual frenectomy. The patient returned after six months for the start of orthodontic treatment.



**Fig 4:** Periapical x ray showing type 5 transmigration according to Mupparapu's Classification

## Treatment

### Aims of treatment

The purpose of the treatment was to correct the left lower canine transposition, restore tongue function, and resolve the left class 2 malocclusion.

### Treatment options

Several treatment options can be performed to treat lower canine transmigration.

Possibility 1: extraction and reimplantation after completion of orthodontic treatment.

Possibility 2: orthodontic relocation of the transmigrated canine, depending on the amount of bone available.

Possibility 3: substitution of the lower canine into the lower central incisor and the lower lateral incisor into a canine.

## Discussion

Transmigration was described by Nodine in prehistoric skulls, and Thoma was the first to report the anomaly in living patients in 1952 (Thoma *et al*, 1952) [12]. Transmigration is an anomaly where a lower canine moves across the midline of the mandible (Tarsitano *et al*.1971) [11]. This movement can occur without an identified pathologic cause (Joshi, 2001; Javid, 1985) [6, 5].

The clinical case that we presented meets a rare case of type 5 transmigration according to Mupparapu's classification and would represent 1.5% of transmigration cases.

Treatment options for a transmigrated canine will depend on several factors such as the maturation of the canine, the depth of displacement, and also the location of the canine when it is discovered.

Early treatment consists of the extraction, around the age of 8 to 9 years, of a persistent temporary tooth part, or a pathological obstacle that prevents the lower canine from erupting onto the mandibular arch correctly (Umashree *et al*, 2013) [13].

At this early stage of discovery, ortho-surgical traction treatment can be performed to return the transmigrated canine to its correct position. However, if its mesial portion has moved more than a part of the contralateral anterior teeth, or if its distal portion protrudes beyond the lower lateral incisor on the affected side, it is unlikely to be turned by orthodontic treatment (Joshi, 2001; Javid,1985) [6, 5].

Transplantation is another approach to save the transmigration when the tooth is in an ideal location for single-piece dental extraction, without symptoms, and there is enough available area with a remaining temporary canine. The timing of transplantation is important because the primary goal is to gain optimal root height. The prognosis decreases the closer the apex of the root is closed. The period between extraction and transplantation should be minimized, as this is a continuous movement. The risk of failure is mainly due to the desiccation of the periodontal ligament (Umashree *et al*, 2013) [13].

The indication for extraction is when the affected canine has moved beyond the root of the lower lateral incisor or in the presence of surrounding pathological symptoms. Orthodontic traction treatment would be contraindicated in this case (Umashree *et al*, 2013) [13].

If the transmigrated cuspid is out and transposed to the dental arch, the tooth can be orthodontically aligned and reshaped into a lateral and the lateral into a canine (Umashree *et al*, 2013) [13].

In our case, we had chosen to correct the transmigration of 33

by substituting it into 31 and 32 into 33.

## Conclusion

Mandibular canine transmigration is a rare entity that occurs specifically in the mandibular arch posing a real diagnostic challenge. Clinical examination alone would be insufficient to diagnose this dental anomaly. It is necessary to be assisted by complementary radiological examinations such as panoramic, and dental retro-alveolar radiography in order to establish the precise diagnosis and to propose the best therapeutic choice to the patient.

## Patient consent

Written consent was obtained for publication.

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## Conflicts of interest

No conflicts of interest.

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