



Transmigrant impacted mandibular canine: a case report

Transmigração de canino impactado em mandíbula: relato de caso

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ABSTRACT

Transmigration of canines across mandibular midline is a rare and elusive phenomenon described in the dental literature. Etiology of this phenomenon is obscure, but in some cases supernumerary teeth may be one of the causes. Surgical extraction is indicated due to pathologic lesions, infection, trauma to the adjacent teeth, pain, ectopic eruption and interference with prosthesis they may cause. The aim of this paper is to describe the treatment of a transmigrant impacted mandibular canine near the inferior border and to review the literature about its incidence, prevalence and treatment options. Vestibular access in the anterior mandible was performed followed by osteotomy and odontosection, for tooth removal. Canine impaction is more prevalent in the maxilla than in the mandible, but canine transmigration is more frequent in the mandible. Females seem to be more affected than males, with the left side being more prevalent than the right. Although the literature is controversial about treatment protocol for transmigrant teeth several authors indicate its extraction to prevent lesions that are associated with impacted teeth, specially when orthodontic traction is contraindicated due to the position of those dental units.

KEYWORDS

Tooth, Impacted; Mandible; Tooth Migration.

RESUMO

Transmigração de caninos através da linha mediana mandibular é um fenômeno raro descrito na literatura odontológica. A etiologia deste fenômeno é obscura, mas em alguns casos os dentes supranumerários podem ser uma das possíveis causas. A extração cirúrgica é indicada devido a lesões patológicas, infecção, trauma aos dentes adjacentes, dor, erupção ectópica e possível interferência ao uso de próteses que possam causar. O objetivo deste trabalho é descrever o tratamento de um canino mandibular transmigrado perto da borda inferior e analisar a literatura sobre sua incidência, prevalência e opções terapêuticas. Acesso vestibular na mandíbula anterior foi realizado seguido de osteotomia e odontoseção, para remoção do dente. A impação canina é mais prevalente na maxila do que na mandíbula, mas a transmigração canina é mais frequente na mandíbula. Mulheres parecem ser mais afetadas do que os homens, com o lado esquerdo sendo mais prevalente do que o direito. Embora a literatura seja controversa quanto ao protocolo de tratamento para dentes transmigrados, vários autores indicam sua extração para prevenir lesões associadas aos dentes impactados, especialmente quando o tracionamento ortodôntico é contra-indicado devido à posição dessas unidades dentárias.

PALAVRAS-CHAVE

Dente impactado; Mandíbula; Migração dentária

INTRODUCTION

Impaction of permanent canines is a fairly common clinical situation in dental offices, mainly due to lack of space in the dental arch, as these are one of the last teeth to erupt. Less common findings are related to the pre-eruptive migration of a tooth across the midline, known as transmigration. Transmigration is rare and occurs only in permanent dentition [1-3].

Etiology of impaction of mandibular canines varies from traumatic factors, lack of space, long path of eruption of the canine tooth germ, premature loss of deciduous teeth, abnormal length of crown, hereditary factors, functional disorders of the endocrine glands, tumors and odontomas [1].

The exact mechanism of transmigration is not yet known, and there are many hypotheses about it. Abnormal displacement of the tooth germ in the embryonic life is a commonly accepted explanation [4]. The path of least resistance probably determines the direction of movement of the migrating tooth. It follows the direction of its long axis, with the crown leading the migration [5].

For diagnose, localization and treatment planning, intraoral radiographs are usually not sufficient, and should invariably be supplemented with an occlusal and extraoral radiograph, preferably an orthopantomographic radiograph [2,5,6]. Although computed tomography is considered the gold standard for diagnosis, Aydin and Yilmaz [7]. proved that through routine radiographic examination with orthopantomographic radiograph, this condition can be easily diagnosed and classified.

Like all impacted teeth, a transmigrant canine may develop a pathologic lesion, infection, trauma to the adjacent teeth, pain, ectopic eruption and interference with prosthesis, which justifies their surgical extraction [1].

A literature research was made in the year of 2015, using the terms “canine” and “transmigration” in PubMed/MEDLINE and a hole of 83 articles were found. All papers that reported transmigrated case reports of mandibular canines crossing the midline, which represented 53 of them, were inserted in a table (Table I). Among the papers found, some reported cases of bimaxillary transmigration of impacted canines [8] and others cases of double transmigration [9].

Table I - All 53 papers that reported case reports of mandibular canines crossing the midline, published at PubMed/MEDLINE until july of 2015.

	Authors	Year
1	Goyal L.	2015
2	Vaida L, Todor BI, Corega C, Băciuț M, Băciuț G.	2014
3	Gruszka K, Różyło TK, Różyło-Kalinowska I, Denkiewicz K, Masłowska K	2014
4	Bahl R, Singla J, Gupta M, Malhotra A	2013
5	Madiraju GS, Rao KS, Singamaneni V.	2013
6	Umashree N, Kumar A, Nagaraj T.	2013
7	Kumar S, Jayaswal P, Pentapati KC, Valiathan A, Kotak N.	2012
8	Devadoss P, Neelakandan RS, Bhargava D, Ramakrishnan T.	2012
9	Qaradaghi IFMT.	2012
10	Mazinis E, Zafeiriadis A, Karathanasis A, Lambrianidis T.	2012

	Authors	Year
11	Kumar S, Urala AS, Kamath AT, Jayaswal P, Valiathan A.	2012
12	Holla A, Saify M, Parashar S.	2012
13	Kontham U, Kontham R, Mistry J.	2012
14	Kara MI, Ay S, Aktan AM, Sener I, Bereket C, Ezirganli S, Demirkol M.	2011
15	Sharma G, Nagpal A.	2011
16	Gunashekhar M, Rohini M.	2011
17	Tejavathi N, Umashree N.	2011
18	Trakyali G, Cildir SK, Sandalli N.	2010
19	Aktan AM, Kara S, Akgünlü F, Malkoç S.	2010
20	Celikoglu M, Kamak H, Oktay H.	2010
21	Vuchkova J, Farah CS.	2010

22	Buyukkurt MC, Aras MH, Caglaroglu M.	2008
23	Aktan AM, Kara S, Akgunlu F, Isman E, Malkoc S.	2008
24	González-Sánchez MA, Berini-Aytés L, Gay-Escoda C.	2007
25	Camilleri S.	2007
26	Sumer P, Sumer M, Ozden B, Otan F.	2007
27	Auluck A, Nagpal A, Setty S, Pai KM, Sunny J.	2006
28	Kuroi J.	2006
29	Torres-Lagares D, Flores-Ruiz R, Infante-Cossío P, García-Calderón M, Gutiérrez-Pérez JL.	2006
30	Auluck A, Mupparapu M.	2006
31	Batra P, Leyland L.	2005
32	Ryan FS, Batra P, Witherow H, Calvert M.	2005
33	Shapira Y, Kuflinec MM.	2005
34	Aydin U, Yilmaz HH, Yildirim D.	2004
35	Camilleri S, Scerri E.	2003
36	Shapira Y, Kuflinec MM.	2003
37	Aydin U, Yilmaz HH.	2003

38	Sanu OO, Ogunlewe MO.	2003
39	Mupparapu M.	2002
40	Dhawan P, Roychoudhury A, Prakash H, Duggal R.	2001
41	Joshi MR.	2001
42	Alaejos-Algarra C, Berini-Aytes L, Gay-Escoda C.	1998
43	Costello JP, Worth JC, Jones AG.	1996
44	al-Waheidi EM.	1996
45	Kuflinec MM, Shapira Y.	1995
46	Joshi MR, Shetye SB.	1994
47	Pippi R, Sfaciotti GL.	1994
48	Vichi M, Franchi L.	1991
49	Shanmugasantharam P, Boon LC.	1991
50	Zvolanek JW.	1986
51	Nashashibi IA, Abu Shalhoub S.	1984
52	O'Carroll MK.	1984
53	Kaufman AY, Buchner A, Gan R, Hashomer T.	1967

The aim of this paper is to describe the treatment of a transmigrant impacted mandibular canine near the inferior border and to review the literature about transmigrant impacted mandibular canines, including its incidence, prevalence and treatment options.

LITERATURE REVIEW

Canine impaction is more prevalent in the maxilla than in the mandible, but canine transmigration is more frequent in the mandible. An even less common finding is the migration of a mandibular canine from its normal position to the contralateral hemiarch, crossing the midline (transmigration) and it occurs almost exclusively with mandibular canines [4,10-12]. It is less common for the impacted canine to migrate distally [5].

Tarsitano *et al.* [13] defined transmigration as a phenomenon in which an unerupted mandibular canine migrates, crossing the mandibular midline. In 1985, Javid [14] modified Tarsitano's [13] definition, adding that one-half or more of the length of the tooth was required to cross the midline. But, for Joshi [6] and Auluck *et al.* [15] it is more important

to consider the tendency of a canine to cross the barrier of the mandibular midline suture than the distance of migration after crossing the midline. Hyppolito *et al.* [1] and González-Sánchez *et al.* [11] indicate that females seem to be more affected than men are, with the left side being more prevalent than the right.

Candeiro and Tavares [2] reported that the early loss of the deciduous canine, resulting in insufficient space in the arcade and malposition of the tooth germ are the most common causes of impacted teeth. For González-Sánchez *et al.* [11], Shapira and Kuflinec [5] and Joshi [6], transmigrant canine may be associated with pathological conditions such as follicular cysts, odontomas or supernumerary teeth.

The classification based on the migration pattern and final position of mandibular transmigrant canines was asserted by Mupparapu [16] in 2002: Type 1 for a canine impacted mesio-angularly across the midline, labial or lingual to the anterior teeth; Type 2 for a canine horizontally impacted near the inferior border of the mandible inferior to the apices of the incisors; Type 3 for a canine erupting on the opposite side of the jaw; Type 4 for a canine

horizontally impacted near the inferior border of the contralateral side and Type 5 regardless of eruption status, canine positioned vertically in the midline with the long axis of the tooth crossing the midline.

Some clinicians prefer not to treat an impacted canine if symptoms are absent or when there is a serious risk of damaging important anatomical structures. In these cases, clinicians must perform periodic clinical and radiologic follow-up visits to ensure early detection of potential pathology associated with an impacted canine [10,11,17].

For Joshi [6], in cases which transmigrated canines are asymptomatic, radiographic examination at regular intervals would definitely help early detection of further migration or development of some pathological changes around the tooth in question. The deciduous canine remains over-retained most of the time in such cases; its root may show slow signs of resorption.

DESCRIPTION OF CASE

Female patient, 16 years old, in orthodontic accompaniment for about six months, was routed to a referral center in the state of Bahia, for extraction of impacted tooth in mandibular symphysis and traction of included tooth in maxilla.

There was acceptance of the patient's responsible in relation to the proposed treatment protocol adopted, as well as authorization for photographic records and subsequent publication of the case in scientific literature as the regulations of the Ethics Committee of the Bahiana School of Medicine and Public Health, by signing the instrument of Informed Consent.

Clinical evaluation showed supernumerary teeth in the anterior area of the mandible, and units 2.3 and 3.3 unerupted. The orthodontic planning indicated traction of included unit 2.3 and extraction of the 3.3.

Panoramic radiograph's analysis showed the presence of unit 3.3 impacted in horizontal position, near mandibular base with the crown below the apex of the lower incisors and right canine (Figure 1). The 2.3 dental unit was impacted on the palate, and it presented mesion-angled crown near the root of unit 2.2, but in favorable position for orthodontic traction. Image of the unit 6.3 suggested root reabsorption.

Therapeutic approach proposal was in accordance to other authors described in the literature. [18-20] For removal of impacted teeth, vestibular access was performed in the anterior mandible, osteotomy and odontosection with a 702 surgical carbide bur were required to allow removal of the impacted tooth (Figure 2). Suture by plans was performed after copious irrigation with saline 0.9%.

Patient had no dehiscence or wound infection, although referred paresthesia of the chin with improvement after the first postoperative month. Eighteen months after surgery, panoramic radiograph's analysis showed complete bone formation in the anterior region of mandible (Figure 3).



Figure 1 - Preoperative panoramic radiograph showing tooth 3.3 in horizontal position impacted in symphysis, near the mandibular base, with the crown below the apex of the lower incisors and right canine and tooth 2.3 impacted on the palate, mesio-angled, with the root crown next to unit 2.2.

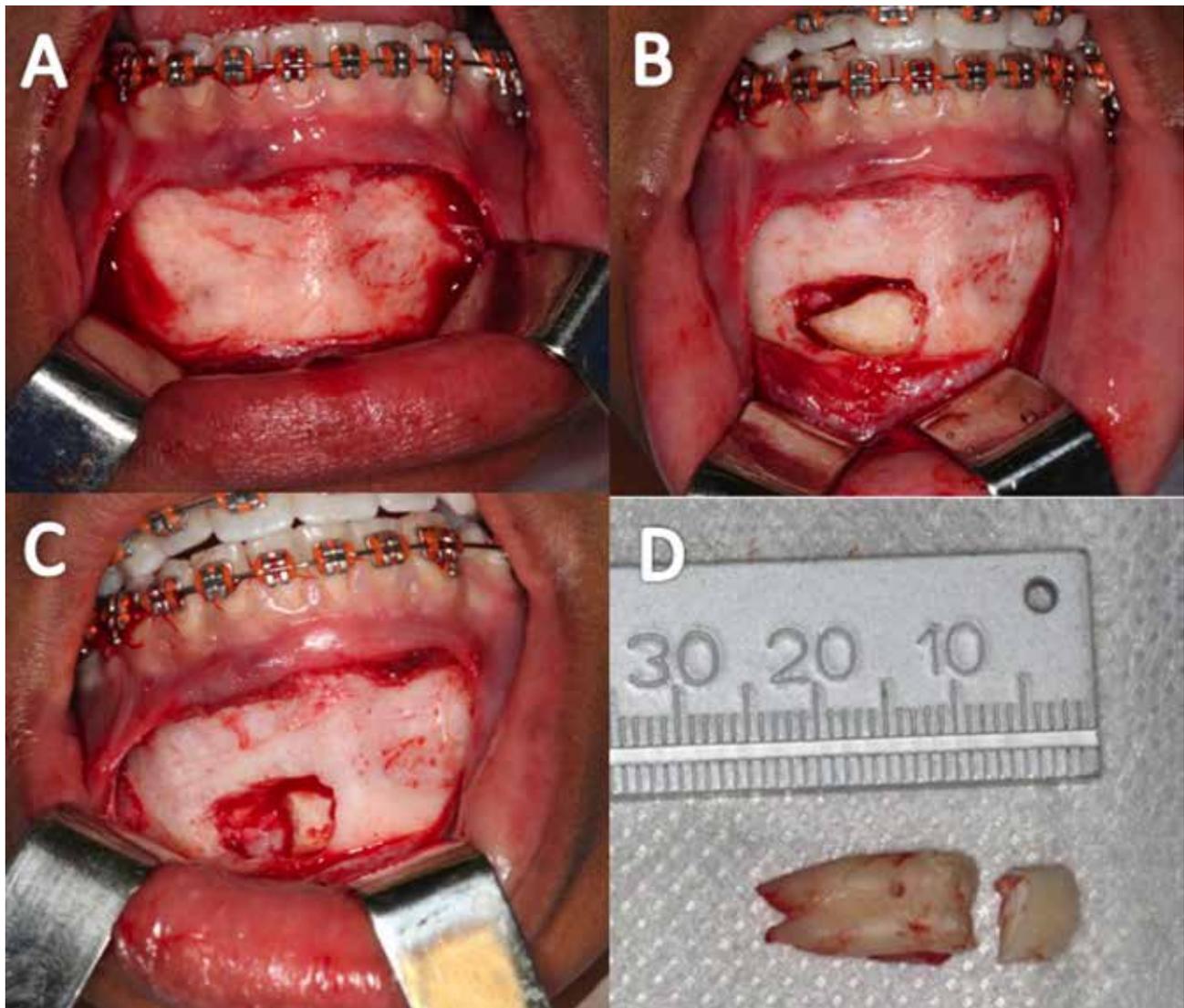


Figure 2 - A) Vestibular mandibular access with subperiosteal detachment; B) Osteotomy for total exposure of the crown of the impacted unit; C) Odontosection to separate the dental crown and root; D) Crown and root extracted.



Figure 3 - Postoperative panoramic radiograph control (eighteen months) showing bone formation in the anterior mandible and preservation of mandibular base contour, and unit 2.3 already in position in the upper arch.

DISCUSSION

The reported case seems to agree with the prevalence reported in the literature, since it is a female patient, presenting mandibular canine included crossing the midline [4,10-12].

According to González-Sánchez *et al.* [11], Shapira and Kuflinec [5] and Joshi [6], transmigrant canines may be associated with supernumerary teeth, which may explain the transmigrant mandibular canine in the described case, where a supernumerary tooth was present in the anterior region.

Some authors [5,21] claim that, misplaced impacted mandibular canines, may not be detected in a routine intraoral periapical radiograph. Therefore, the use of a panoramic radiograph is imperative and recommended for discovering such rare malpositions. In agreement with that, the inferior canine located near inferior border of the mandible that was presented in this case, could only be diagnosed with the panoramic radiograph.

In accordance with Mupparapu [16], which states that the most frequently encountered type of transmigrant teeth is type 1, followed by type 2 and then type 4, the described case may be classified as type 2, where canines are horizontally impacted near the inferior border of the mandible inferior to the apices of the incisors.

Hyppolito *et al.* [1] and Auluck *et al.* [15], say that if mandibular incisors are in a normal position and space for the transmigrated canine is sufficient, transplantation may be undertaken. Surgical exposure with orthodontic realignment can also be done for labially impacted transmigrated canine. However, if the crown of the transmigrated canine moves past the opposite incisor area or if the apex is seen to have migrated past the apex of the adjacent lateral incisor, it might be mechanically impossible to bring the tooth back into place. In such cases, authors say that extraction is preferred. Corroborating with those authors, in the present case the impossibility of performing orthodontic traction because of tooth's position allows one to infer that extraction is the only choice of treatment.

For Corsi *et al.* [22] treatment considerations for transmigrant teeth depend on the stage of development and distance of migration at the time they are identified. When detected early, the tooth can be surgically exposed and moved using orthodontic forces. In addition, when the root apices are closed, extraction often is the only choice. Reinforcing again the extraction indication of of the transmigrated tooth.

Before surgical procedure, it is necessary to take care to anesthetize the transmigrated tooth from the side where it originates, therefore they maintain their nerve supply from the original side. [5,6,21] In some cases, both mandibular nerves can be blocked. The anesthetic technique used in this case involved both mentals nerves.

Buyukkurt *et al.* [23] recommend that impacted mandibular canines near the inferior border of the mandible should be removed by an extraoral approach, because it provides better surgical access and necessitates less removal of bone comparing to an intraoral approach. Opposed to this, Joshi [6] points out that extraction of a transmigrated tooth should be performed as far as possible through an intraoral approach. Nevertheless, if necessary, an extraoral approach can be adopted. In the present case, intraoral access was the technique of choice. It promoted good visibility, few bone tissue remove and enabled the performing of the procedure in an outpatient setting.

FINAL CONSIDERATIONS

Canine impaction is more prevalent in the maxilla than in the mandible, but canine transmigration is more frequent in the mandible. Females seem to be more affected than males, with the left side being more prevalent than the right. Treatment options seems to depend on the stage of development and distance of migration at the time they are identified, however extraction of the transmigrated tooth appeared to be the most common choice of treatment.

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