

## **A Rare Case of Bilateral Labially Impacted Horizontally Positioned and Transmigrated Maxillary Kissing Canines**

**Aliya Khan<sup>1</sup>, Janardan Garde<sup>2</sup> and Sharayu Dhande<sup>3\*</sup>**

<sup>1</sup>II Year PG Student, Department of Oral and Maxillofacial Surgery, M A Rangoonwala College of Dental Sciences and Research Centre, Pune, India

<sup>2</sup>Professor and HOD, M A Rangoonwala College of Dental Sciences and Research Centre, Pune, India

<sup>3</sup>Assistant Professor, Sinhgad Dental College and Hospital, Pune, India

**\*Corresponding Author:** Sharayu Dhande, Assistant Professor, Sinhgad Dental College and Hospital, Pune, India.

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### **Abstract**

The permanent maxillary canines are not only considered to be “cornerstone of the dental arch” due to their significance contributing to masticatory function, stability of the dental arch but they also add up to the foundation of enhancing esthetics of an individual and maintaining functional occlusion. An unerupted canine crossing the midline is known as a transmigrated canine. The most common teeth showing ectopic eruption are maxillary first molars, maxillary canines followed by mandibular lateral incisors. Timely detection of these anomalies could help treat them less aggressively and preserve them by orthodontic intervention or by surgical transplantation. We report a case of labially impacted horizontally positioned transmigrated bilateral kissing canines in maxillary anterior region.

**Keywords:** Permanent Maxillary Canines; Impacted Canines; Transmigrated Canines; Kissing Canines; Unerupted Canine; Corner Stone of Arch

### **Introduction**

A tooth is said to be impacted when it is found unerupted for at least 6 months with complete root development. The permanent maxillary canines are the most commonly impacted teeth in the upper jaw [1,2].

The incidence of permanent maxillary canine impaction varies from 1 - 2.5% [3]. The incidence of palatal impaction is more commonly encountered compared to labial canine impaction [4]. Females are twice more commonly affected by canine impaction compared to males [5].

No specific aetiology has been proposed for transmigration and impaction of canines. Factors like ectopic growth of the tooth bud, premature loss of tooth bud, over-retention of primary canines, inadequate eruption space, over-sized primary teeth, genetic factors, underlying endocrine aetiologies, unfavourable arch length and trauma could be proposed as major contributing factors in impaction and transmigration of maxillary canines [6-8].

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The following clinical signs might be indicative of canine impaction [9]:

1. Delayed eruption of the permanent canine or prolonged retention of the deciduous canine beyond 14 - 15 years of age,
2. Absence of a normal labial canine bulge,
3. Presence of a palatal bulge, and
4. Delayed eruption, distal tipping, or migration (splaying) of the lateral incisor.

These impacted and transmigrated teeth most of the times remain asymptomatic [10].

Surgical intervention is necessary when any individual attempts for enhancing their smile by the way of orthodontic treatment and when these teeth become symptomatic further causing pressure resorption of roots or tilting of adjacent teeth further causing tenderness and neuralgic symptoms [11-13].

The following sequelae were suggested by Shafer's, *et al.* for canine impaction [14]:

- Labial or lingual mal-positioning of the impacted tooth,
- Migration of the neighbouring teeth and loss of arch length,
- Internal resorption,
- Dentigerous cyst formation,
- External root resorption of the impacted tooth, as well as the neighbouring teeth,
- Infection particularly with partial eruption, and
- Referred pain and combinations of the above sequelae.

Few studies have reported that in 0.71% of children ranging from 10 - 13 years age group, permanent incisors have showed resorption because of the ectopic eruption of maxillary canines [15]. Thoma along with Fiedler and Alling advocated surgical intervention by the way of extraction of the transmigrated canines, rather than impractical way of orthodontically correcting them [16]. Over-retention of these impacted transmigrated teeth can cause damage to the adjacent hard and soft tissues, iatrogenic damage to adjacent teeth or may even deteriorate periodontal conditions [17].

This case report focusses on bilateral labially impacted horizontally positioned transmigrated kissing canines in maxillary anterior region.

### Clinical Presentation

A 22 year old female patient reported to the clinic with chief complaint of missing canines. Intra-oral examination revealed ongoing orthodontic treatment to treat the mal-aligned teeth. Further examination showed missing canines in the upper maxillary region of the jaw. A CBCT (Cone beam computed tomography) was advised which revealed bilateral horizontally impacted and transmigrated labially posited maxillary canines in a kissing position. Orthodontically it was nearly impracticable to get both the canines back to their original position and hence surgical extraction of both of them was the preferred treatment of choice. The patient was informed about future consequences of impacted over-retained transmigrated canines and further surgical phase was initiated on receiving consent of the patient.

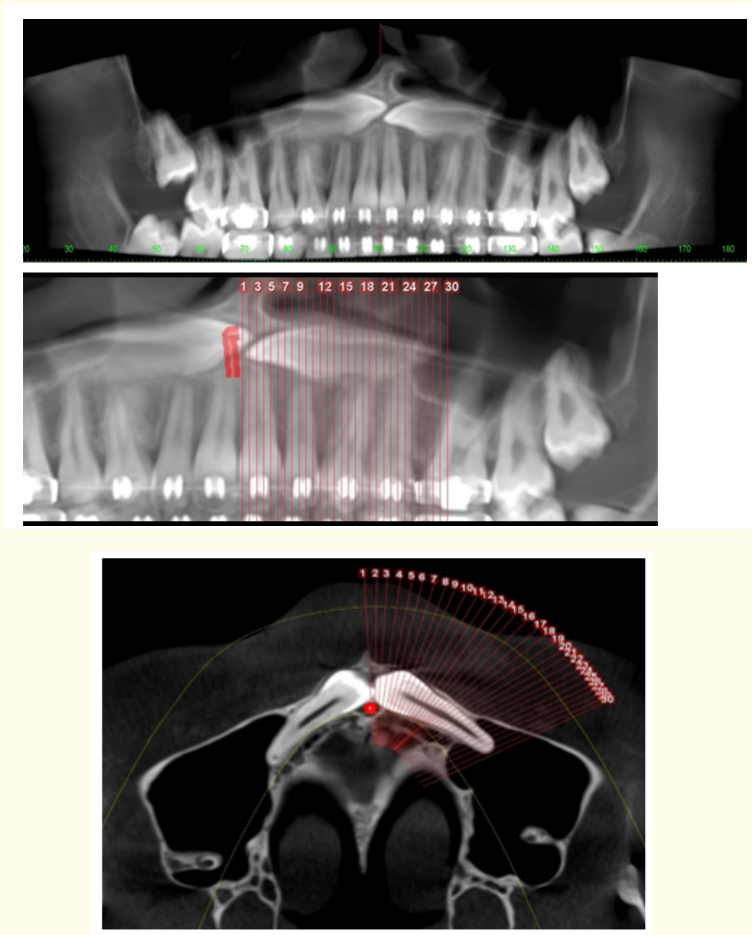
The initial line of treatment was Phase I therapy included ultrasonic scaling and root planning followed routine haematological investigations and a written informed consent was obtained from the patient.

In the surgical phase, painting and draping of the patient was carried out. Local anaesthesia (2% lignocaine hydrochloride) with adrenalin was infiltrated in the adjacent tissues. Initially, crevicular incision was given from 14 to 24 after which vertical incisions at 14 and 24. Following which a full thickness muco-periosteal flap was reflected beyond muco-gingival junction. Bone present over the impacted canines was removed with a help of small round bur no-702. The exposed canines were then horizontally sectioned with a help of straight fissure bur. Crown of both the canines along with root portion were completely removed. The full-thickness muco-periosteal flap was re-positioned and sutured with interrupted sutures using 4-0 non-resorbable suture. The patient was prescribed antibiotics (Tab Augmentin 625mg twice a day after food) and analgesics (Tab Enzoflam twice a day after food) with an antacid (Tab Pan D twice a day, half an hour before food) for 5 days and was recalled for suture removal after 10 days. The patient was asked to maintain stringent plaque control during this phase.

At the end of 10 days, suture removal was carried out. The patient was recalled after a month for a follow-up and the healing was found to be uneventful.

**Radiographic interpretation:** A CBCT was advised to the patient.

**Pre-surgical assessment of the bilateral impacted maxillary canines**



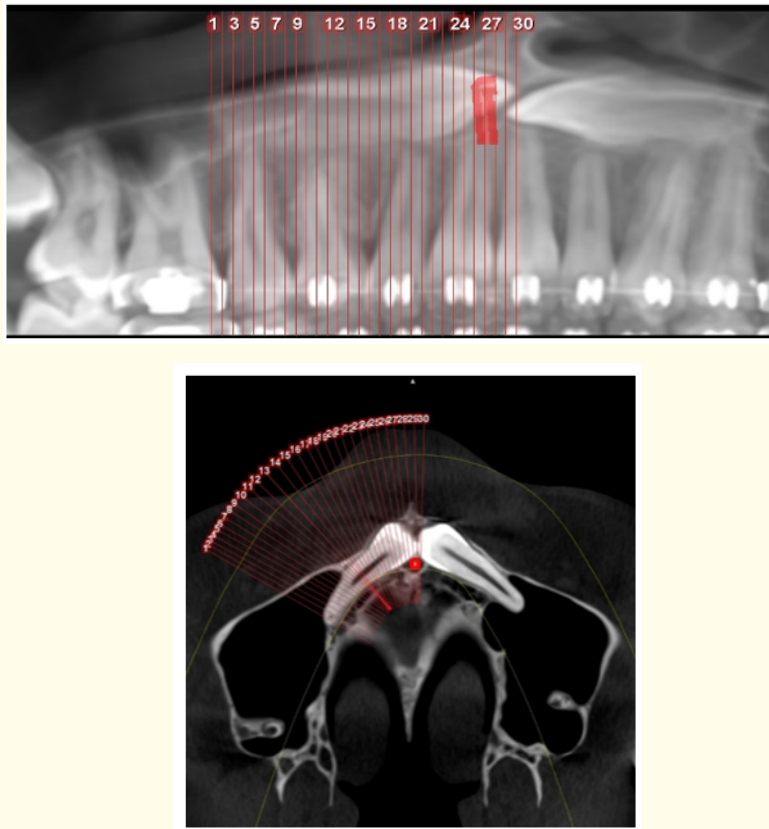


Figure 1

Re-constructed 3D image

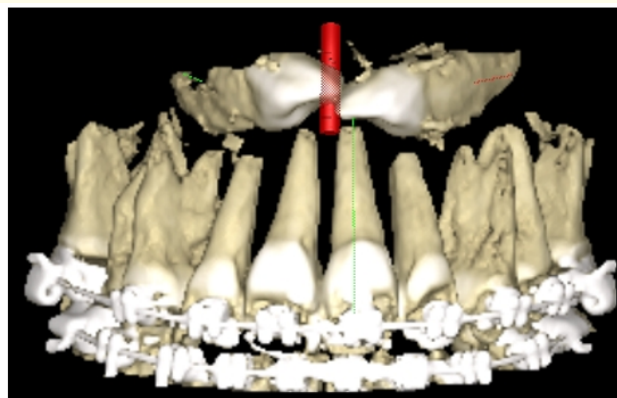


Figure 2

Coronal sections

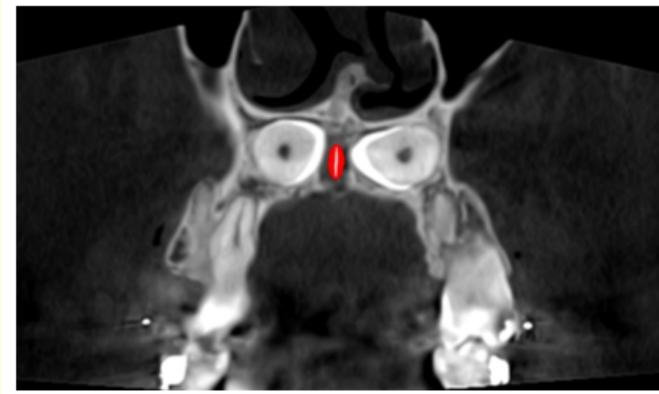


Figure 3

Sagittal sections

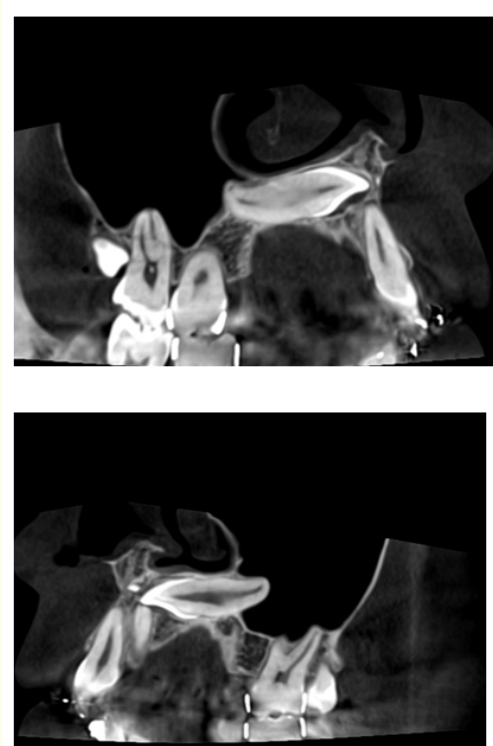


Figure 4

**Provisional diagnosis:** Bilateral impacted maxillary canines.

**Differential diagnosis:** Congenitally missing maxillary canines.

**Final diagnosis:** Bilateral impacted transmigrated maxillary canines.

**Surgical images**

**Pre-operative frontal view**



*Figure 5*

**Reflection of full-thickness muco-periosteal flap**



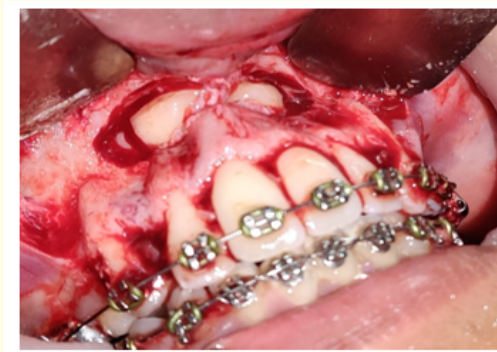
*Figure 6*

**Surgical exposure of impacted canines**



*Figure 7*

**Horizontal sectioning of canines**



*Figure 8*

**Removal of crown portion of canines**



*Figure 9*

Complete removal of canines



Figure 10

Suturing



Figure 11

Post-operative follow-up (3 month)



Figure 12



## Discussion

In the present case report, a case of bilateral impacted transmigrated maxillary canines is discussed. As we all know, for functional occlusion it is essential to bring the impacted canines back into the occlusion.

Numerous etiological theories have been studied for causes of canine impaction of which the guidance theory and genetic theory have been considered the potential cause for impaction of maxillary canine. The guidance theory suggests that this anomaly could be owing to a variety of local factors like congenitally missing lateral incisors, supernumerary teeth, odontomas, transposition of teeth and few other mechanical factors that may interfere with the normal path of eruption of these teeth. Since, maxillary canines have longest course of tooth eruption and have to cover a considerable distance before erupting these could be one of the causes of canine tooth bud displacement and subsequent impaction [18].

Another most commonly studied theory for impacted maxillary canines is the genetic theory. The impacted maxillary canines are often associated with variation in tooth size, shape, number and structure all of which are known to have a genetic link. These anomalies are thought to arise from a shared hereditary trait from the embryonic development. Nevertheless, race and gender differences are apparent, as well as familial and population differences [19,20].

In the present case, the impacted canines were asymptomatic in nature. The reason behind their surgical intervention was missing canines failing to enhance patient's smile during on-going orthodontic treatment. The first step in treatment requires clinical as well as radiographic assessment for determination of position and location of the impacted tooth. As a result, a CBCT was advised. The coronal, sagittal and axial sections of the CBCT show bilateral impacted and transmigrated canines in the maxillary anterior region. As a result, surgical extraction was considered to be the treatment of choice for this case.

Bishara SE., *et al.* 1992 suggested alternative treatment plans [9]:

- No treatment if the patient does not desire it. In such a case, the clinician should periodically evaluate the impacted tooth for any pathologic changes. It should be remembered that the long-term prognosis for retaining the deciduous canine is poor, regardless of its present root length and the aesthetic acceptability of its crown. This is because, in most cases, the root will eventually resorb and the deciduous canine will have to be extracted.
- Auto-transplantation of the canine.
- Extraction of the impacted canine and movement of a first premolar in its position.
- Extraction of the canine and posterior segmental osteotomy to move the buccal segment mesially to close the residual space.
- Prosthetic replacement of the canine.
- Surgical exposure of the canine and orthodontic treatment to bring the tooth into the line of occlusion. This is obviously the most desirable approach.

Hassan., *et al.* 2012 carried out a study in which maxillary impacted canines were brought back in to occlusion with closed eruption technique using fixed appliance therapy [21].

Extraction is considered to be the treatment of choice in following conditions [9]:

- If it is ankylosed and cannot be transplanted,
- If it is undergoing external or internal root resorption,
- If its root is severely dilacerated,

- If the impaction is severe (e.g. the canine is lodged between the roots of the central and lateral incisors and orthodontic movement will jeopardize these teeth),
- If the occlusion is acceptable, with the first premolar in the position of the canine and with an otherwise functional occlusion with well-aligned teeth,
- If there are pathologic changes (e.g. cystic formation, infection), and
- If the patient does not desire orthodontic treatment.

Since the canine impaction seen in the present case was severe enough to jeopardize the central and lateral incisor teeth, extraction was considered as the treatment of the choice.

Al-Waheidi stated that usually, the transmigrated canines are most commonly associated with a cystic lesion. Further according to him; when a cyst is present at the crown of the canine that it may facilitate the process of migration. As we know, cyst is an expansive lesion and as it enlarges that it tends to displace the tooth in any direction in the path of the least resistance. On the contrary, Joshi, *et al.* and Howard, *et al.* stated that the cases of transmigration are not associated with any associated cystic lesions. However, there is no much literature to support the role of cystic lesions in the aetiology of transmigration. The present case was asymptomatic and was not associated with any pathology [22-24].

Tiwari, *et al.* 2018 advocated extraction of impacted maxillary or mandibular canines and concluded that impacted and migrated canines in a kissing position if untreated form a lesion and as a result, always should be treated on time [25]. Another study carried out by Alyami B., *et al.* 2020 was a hospital based retrospective study from 2018 to 2020 in which a total of 2016 panoramic radiographs were screened and all patients with bilateral impacted canines were further screened radiologically using cone beam computed tomography [26].

Bava, *et al.* 2021 treated a case of impacted bilateral mandibular kissing canines with surgical approach followed by orthodontic intervention. This was in accordance with our present case wherein impacted bilateral maxillary kissing canines were treated with surgical approach. The authors concluded surgical extraction of these impacted canines was the most favourable approach [27].

When the cusp tip rest against the apical third of the adjacent incisor root (Subtype a), the poorer the prognosis. A fair prognosis is anticipated when the cusp tip rest at the level of half root length (Subtype b), while a good prognosis is anticipated when the cusp tip is at the cemento-enamel junction (Subtype c) of the adjacent incisor tooth. Based on these two scenarios, Type 1 (Subtype a) has the poorest prognosis in terms of treatment difficulty while Type 3 (Subtype c) has the best treatment prognosis with orthodontic traction [28].

Pitt S., *et al.* 2006 stated a treat difficulty index for unerupted maxillary canines based on regression analysis that the horizontal position (degree of overlap of lateral and central incisors), age of the patient, vertical height, overall status of malalignment of other teeth, bucco-palatal position. The authors concluded all these factors determine the difficulty of canine alignment [29].

Depending on the present observations, as horizontal angulations of impacted canines incline towards the midline (i.e. from Types 3-1 respectively), poor is the prognosis of orthodontic traction/alignment and the higher is the tendency for surgical management of such teeth [30]. Furthermore, few studies stated, the higher the impacted canine cusp tip is near to occlusal plane, the poor is the prognosis for orthodontic intervention for management [1].

Mheissen S., *et al.* 2023 in their literature review stated Bilateral Misplaced maxillary canines are very commonly encountered in orthodontics, with a 2% prevalence. The maxillary canine impaction can be due to genetic or environmental factors. Maxillary canines are

significant part of the “Aesthetic Zone” are important in terms of enhancing aesthetics of an individual. Hence, their impaction is a matter of concern for patients and clinicians alike. Furthermore, impacted canines may be associated with iatrogenic damages such as adjacent root resorption and follicular cysts [31].

### Conclusion

The most desirable treatment plan for managing impacted maxillary canines is early diagnosis and interception of potential impaction. However, in the absence of prevention, clinicians are advised orthodontic treatment followed by surgical exposure of the canine to bring it into occlusion. However, clinicians must formulate treatment plans that are in the best interest of the patient. The most common simplest interceptive procedure used to prevent impaction of permanent canines is the timely extraction of the primary canines in order to allow the permanent canines to become upright at their position and erupt properly into the dental arch, provided sufficient space is available to accommodate them. Although, numerous surgical and orthodontic techniques may be used to recover impacted maxillary canines. Nevertheless, an inter-disciplinary approach with careful selection and execution of the above techniques is essential for managing such impacted canines.

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