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## **Non extraction orthodontic management of class I malocclusion with ectopically placed canine: A case report**

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### **Abstract**

Any permanent tooth can be ectopic, and the cause may be both genetic and environmental. Orthodontic treatment is justified because ectopic canine teeth can migrate in the jaw bone and cause damage to the adjacent teeth roots and bone. Orthodontic treatment is also justifiable for aesthetic reasons. Diagnosis and treatment of ectopically erupting permanent maxillary canines requires proper management by the orthodontist. Internal or external root resorption of teeth adjacent to the ectopic canine is the most common sequel. Extraction treatment of ectopic canines can compromise the patient's profile. This article represents a case of non extraction treatment approach for buccally displaced or ectopic canine in a patient with moderate crowding in the maxillary and mandibular arch.

**Keywords:** Canine impaction, non extraction treatment, labially placed

### **Introduction**

#### **Background**

Ectopic buccally erupted maxillary canines are one of the most common conditions in orthodontic practice. The studies shows that permanent maxillary canine impaction or ectopic eruption in the general population is nearly 1-2% [1-2] palatally displaced canines (PDC) occur twice as commonly as buccally [1-3]. However, buccally erupted canines (BDC) are commonly seen in orthodontic practice. When a patient with PDC, erupted and unerupted, are compared with a patients with BDC, erupted and unerupted, the major difference between these two problems are discrepancy in tooth size-arch length relationship.

There are many etiology has been proven to explain the prevalence of majority of ectopic eruptions or to allow differential explanation of those occurring either labially or palatally. Environmental factors can contribute to this condition during the long, tortuous eruption path of a canine. Another explanation is that a changes associated with the follicle of the unerupted tooth may affect the direction of erupting teeth and contribute to the ectopic eruption of the maxillary canine. This case report represents a case of non extraction management of ectopically placed maxillary canine [4]

### **Case description**

A 15-year-old post pubertal female presented with the chief complaint of the buccally erupted ectopic maxillary canine. The patient had a routine dental history. The patient presented a symmetrical face and a convex profile. When smiling, the patient showed 100% display of maxillary incisors and 0.5 mm of gingiva (figure 1). Intraoral examination revealed a Class I molar relationship bilaterally, 2-mm overjet and 3mm overbite. The maxillary midline coincide with facial midline and the maxillary arch exhibited moderate arch crowding and presents of retained deciduous 53,54 and 64 were noted. The mandibular midline shifted to left by 2mm and also showed moderate crowding. The maxillary right and left canines had erupted ectopically in the arch (figure 2). The panoramic radiograph showed no pathologies. The maxillary and mandibular third molars were developing (figure 3). The lateral cephalometric finding are mentioned in Table 1 the patient had a skeletal Class I jaw basis with a hypodivergent growth pattern. The patient's maxillary incisors were proclined and the mandibular incisors were slightly proclined.



**Fig 1:** Pre treatment extra oral photographs



**Fig 2:** Pre treatment intra oral photographs

**Investigations**

As a part of diagnostic aid we had advised Orthopantomogram, Lateral Cephalogram (figure 4) and IOPAR.

**Table 1:** Pre treatment cephalometric values

Findings	Value
SNA	76°
SNB	74°
ANB	2°
Wits Appraisal	BO>AO by 2mm
GO-GN-SN	30°
UI – NA	7mm
UI-NB	6mm
Interincisal Angle	120°
IMPA	103°
Naso Labial Angle	108°



**Fig 3:** Pre treatment Orthopantomogram



**Fig 4:** Pre treatment Lateral Cephalogram

**Treatment objectives**

The treatment objectives were-

- To correct the ectopic position of the maxillary canines.
- To correct the mandibular midline discrepancy.
- To relieve the crowding on both arches, obtain a normal over jet and overbite.

On the basis of diagnostic records, a treatment plan to correct the ectopic position of the maxillary canine through non extraction was selected. The reason behind that to avoid compromising the patient's profile and for a more stable treatment outcome.

**Treatment alternatives**

Various treatment options have been suggested to correct maxillary ectopic canines. Extraction treatment of the maxillary first premolars and the mandibular first premolars with maximum anchorage on the maxillary and mandibular arch to correct the canine relationship and crowding in the mandibular arch was one option. Another option was to extract the retained deciduous teeth and utilize the space for canine accommodation. However, extraction treatment involves a longer treatment time to correct and less chances of retraction and availability of adequate space for ectopically erupted canine. Non-extraction treatment plan was selected in both upper and lower arch.

**Treatment progress**

Patient started Fixed orthodontic treatment with MBT 0.022 slot; maxillary deciduous 53,54 and 64 extracted. Maxillary arch was started with 0.012 HANT continous arch mechanics to alignment of ectopically placed canine. After 6 months of treatment, a significant amount of retraction of canines had been made (figure 5).

At the same time mandibular arch was started with 0.016 nickel titanium. After 6 months of treatment, a significant amount of progress had been made in aligning the maxillary and mandibular arch to accommodate the ectopic canine. Alignment of the canine and maxillary and mandibular dentition greatly improved as the wire progressed from 0.014-in to a 0.017 × 0.025-in nickel-titanium. The patient and parents were satisfied about the treatment progress. Total treatment time was 12 months. A maxillary removable retainer was given to keep the ectopic canine in optimal

position (figure 6). A mandibular fixed retainer was given at the same time. To ensure continued satisfactory post-treatment alignment of the maxillary and mandibular anterior dentition, the continued use of retainers is advised (figure 7).



**Fig 5:** Post treatment extra Oral photographs



**Fig 6:** Post treatment intra oral photographs

## Discussion

Maxillary canines that are frequently impacted or ectopically erupting may be inadvertently overlooked in the mixed dentition patient. This is because of individual changes in eruption sequence and timing. Frequent panoramic and selective periapical radiographs along with a proper clinical examination that includes intraoral palpation permits early diagnosis of unerupted, ectopic, and potentially impacted permanent canines. When such a procedure is apparent, timely interceptive treatment may then be advocated.

The space available in the dental arch for an unerupted canine can be predicted by doing a space analysis with a full set of orthodontic diagnostic records. Space for the unerupted canine can be achieved by maxillary expansion, proclination of maxillary incisors, or extraction of the permanent premolars. During intra palpation, the operator should also analyse the mobility of all the teeth present. Mobile deciduous canines may indicate normal resorption of the roots by the permanent successor. However, mobility of the permanent lateral incisor may indicate potential root resorption by the impacted canine.

If the eruption pattern of the permanent canines seems to be destined for impaction or ectopic eruption, most authors suggest that the primary canine should be extracted [5-10]. This in fact has been shown to be effective in up to 91% when the permanent canine is located distal to the long axis of the lateral incisor, yet only 64% effective when the canine overlaps medially to the long axis midline of the lateral

incisor [11]

In the above case report satisfactory result were achieved through an non extraction treatment plan. If the four premolars were extracted, it might have resulting in compromising the patients profile.

Crowding is found in a minority of PDC cases, and most of the palatally impacted canines occur when excess space is available in the dental arch [12-14]. Buccal displacement of the maxillary canines has been strongly linked with crowding [12-15]. Jacoby reported that only 17% of BDC subjects presented sufficient space for eruption in the arch. Oliver *et al.* found that BDC were more frequent in Orientals who also displayed more crowding, whereas PDC was more frequent among Caucasians [16].

Becker *et al.* Reported reductions in bucco-lingual and M-D tooth sizes of males with PDC, compared with male controls, whereas the teeth of females were similar in size to the female controls. Tooth size and dental arch dimensions are determining factors in dental crowding, but no reported attempts have so far been made to study the specific reason for the dentoalveolar disproportion (lack of space) found in the majority of subjects with BDC [17].

The BDC and PDC diagnosis was made on the basis of a clinical examination and diagnostic radiographs, according to established standardized techniques [18, 19]. In those cases where the canines were initially unerupted and surgical exposure was necessary as an major part of their treatment, this was always performed in the presence of the orthodontist, for objective treatment reasons, and included visual confirmation of the radiographic diagnosis.

## Conclusion

The successful treatment of a patient with an ectopic tooth and moderate crowding can be a challenging task for an orthodontist. Proper treatment of an ectopic canine patient with severe crowding requires careful treatment planning by the orthodontist. The decision to non-extraction is to be good aesthetically, functionally, and for more stable results in these patients. In light of the attention currently being paid to aesthetics as a primary treatment goal for both practitioner and patient, today's treatment plans for patients with ectopic canine must consider more than the orthodontic outcome.

## Clinical significance

- The successful treatment of a patient with an ectopic tooth and moderate crowding can be a challenging task for an orthodontist
- Proper treatment of an ectopic canine patient with severe crowding requires careful treatment planning by the orthodontist
- The decision to non extraction is to be good aesthetically, functionally, and for more stable results in these patient

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