

## Orthodontic Treatment of a Palatally Impacted Maxillary Canine- A Case Report

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### Abstract

Treatment of maxillary impacted canine was always a challenge to the orthodontists. Several treatment options are there for impacted canine like extraction, dis-impaction etc. Successful dis-impaction is always preferable as it helps to gain canine guided occlusion. There are also different modalities for dis-impaction. A 15 years female patient reported with a palatally impacted canine with minor crowding in lower arch. Treatment was started in pre-adjusted MBT prescription. Successful dis-impaction was done by labial auxiliary made from AJW archwire. After treatment class-I canine relation was achieved on both side with correction of crowding in lower arch without significant root resorption.

**Keywords:** Impaction; Palatal Canine Impaction; Dis-Impaction of Canine; Class-I Crowding; Labial Auxiliary Spring

### Introduction

Maxillary canine are the second most commonly impacted tooth after third molar [1]. Maxillary canine impaction occurs in 2% of the population seeking for orthodontic treatment. Incidence of maxillary canine impactions are twice in females than males [2]. Approximately one third of the maxillary impacted canine are located buccally and two third located palatally [3,4]. Palatal canine impaction is also associated with multiple dental anomaly like microdontia, peg laterals, hypodontia, supernumerary tooth etc [5]. So these can be good markers for canine impaction.

Successful diagnosis of palatal impaction can be made by orthopantomogram, occlusal radiograph, CBCT etc. The canine may also be palpable at the palate.

Prognosis of can be done by angulations and position of canine given by Errcition and Kuro [6].

Though there are several ways to treat palatal canine impaction, it was always a challenge for the orthodontists to bring the canine into the arch.

### Case Report

A 15 years female patient reported with palatally impacted canine on left side. On extra-oral examination she has mesoprosopic face with mild convex profile. Lips are competent with inter labial gap of 3 mm (Figure 1).



Figure 1: Pre-treatment extra-oral photograph.

On intra oral examination she had class-I molar relation on both side and class-I canine relation on left side. There was overjet of 5mm and overbite of 6 mm. There was crowding in the lower arch. There is presence of upper deciduous canine on left side (Figure 2).



**Figure 2:** Pre-treatment intra-oral photograph.

### Radiographic examination

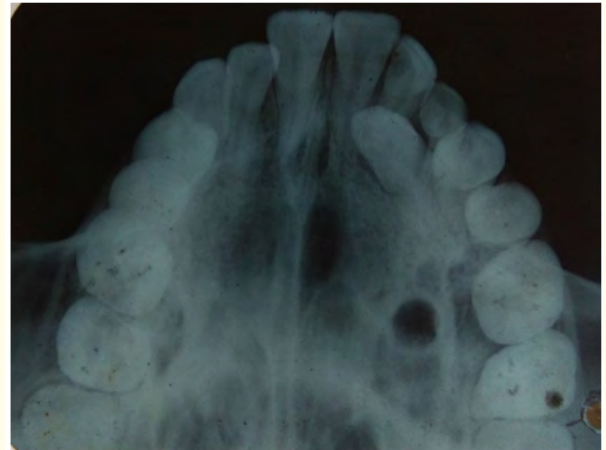
Lateral cephalogram showed class I skeletal base with average growth pattern (Figure 3). Orthopantomogram showed there was an impacted tooth on left side of maxilla (Figure 4). Vertical slob rule with upper occlusal radiograph and orthopantomogram revealed the impacted tooth went upwards in occlusal radiograph indicating palatal impaction (Figure 4 and Figure 5). Though CBCT enables accurate localization of canine impaction [7], it has not been performed as the tooth is palpable properly at palate.



**Figure 3:** Pre-treatment Lateral Cephalogram.



**Figure 4:** Pre OPG.



**Figure 5:** Upper occlusal radiograph.

### Diagnosis

On the basis of all essential and supplemental diagnostic aids this case can be diagnosed as Angle's Class-I malocclusion with class I skeletal base with palatally impacted maxillary left canine.

### Treatment objectives

- Extraction of deciduous left canine.
- Dis-impaction of maxillary left permanent canine.
- De-crowding of lower anteriors.

### Treatment alternatives

- Extraction of the impacted canine.
- Extraction of 34 and 44 for crowding relieving.
- As canine is the corner tooth of the arch and it enhances the esthetics of the patient, in treatment plan it was decided not to extract the permanent canine. Rather it was decided to bring it into the arch.
  - As space discrepancy was borderline, it was decided to go for inter proximal slicing to relief crowding.

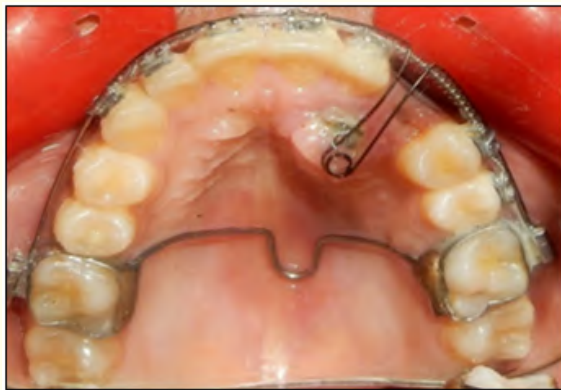
### Treatment progress

Treatment start with fixed mechanotherapy (MBT prescription) in 0.022"X0.28" slot started from 0.014" NiTi in upper arch and 0.012"NiTi in lower arch. Inter proximal reduction was done in lower premolars. After that 0.014"NiTi given in lower arch followed by 0.016 " NiTi and 0.017"X0.025" SS in both upper and lower arch. Open coil spring was placed between 22 and 24. After creating sufficient space for 23, extraction of 63 was carried out and surgical exposure of 23 was done in close method (Figure 6) as it is good for periodontal health [8].



**Figure 6:** Surgical exposure.

A modified ribbon arch bracket was bonded and a ligature wire was tied on 23 and flap was closed (Figure 6). After one week a labial auxiliary wire made by 0.014 AJW was tied with the ligature wire (Figure 7).



**Figure 7:** Labial auxiliary is attached on 23.

After 2 months the crown got exposed to half (Figure 8). Then the labial auxiliary was removed and e-chain was attached (Figure 9).



**Figure 8:** After 2 month of labial auxiliary.



**Figure 9:** E-chain is placed on 23.

After it came to the arch 0.014" NiTi piggy back was given. Then 0.016" NiTi was given followed by 0.017"X0.025" SS (Figure 10). Then 0.019"X0.025" SS was given in both upper and lower arch for final root positioning.



**Figure 10:** After aligning 23.

## Results

The canine was dis-impacted into the arch with proper tip and torque. Class-I canine relation achieved on both side of the arch (Figure 11). Consonant smile arc was achieved (Figure 12). 2 mm of overjet and 3 mm of overbite was achieved after treatment. Crowding of lower incisors was relieved (Figure 11) with proper angulations of incisors (Figure 13). Post orthopantomogram showed no significant root resorption (Figure 14).

## Discussion

A 15 years female patient reported with left maxillary canine impaction. There was crowding in lower incisors.

Treatment was done in fixed mechanotherapy in MBT prescription. Surgical exposure was done in closed method and a labial auxiliary wire was given for dis-impaction as the canine was in favorable position for dis-impaction and to established canine

guided occlusion. After the crown got exposed, an e- chain was attached to it. After it came into the arch, it was ligated with the arch wire.

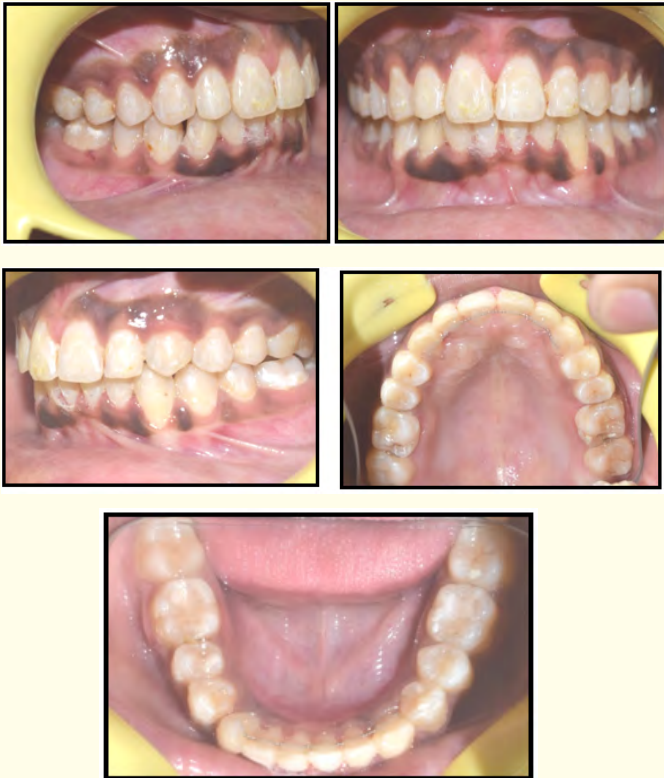


Figure 11: Post treatment intra-oral photograph.

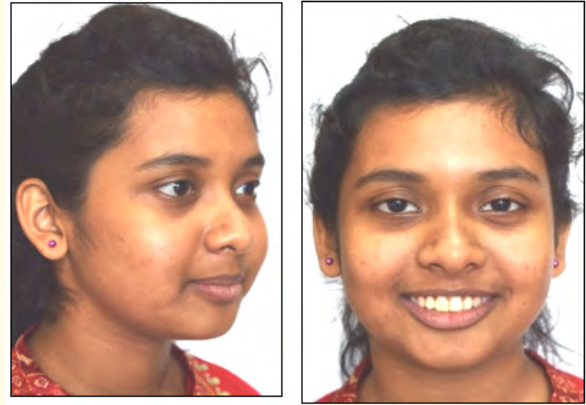


Figure 12: Post treatment extra-oral photograph.



Figure 13: Post treatment lateral cephalogram.



Figure 14: Post Treatment OPG

After treatment class-I canine relation was achieved on both side with correction of crowding in the lower arch. Though the canine has been brought into the arch, the gingival level is not perfect. Gingivectomy could be done to established proper zenith but the patient refused to undergo any further surgical intervention.

Orthopantomogram showed there was no significant root resorption of 23.

### Conclusion

Palatal canine impaction was one of the difficult and challenging treatments in orthodontics. So proper diagnosis and treatment planning is necessary before starting treatment. There were lots of treatment strategies for dis-impaction. Orthodontists should choose the proper treatment plan to give the best esthetic and functional result and also shorten the treatment duration.

### Conflict of Interest

None.

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