

# Palatally Impacted Maxillary Canine with Ipsilateral Highly Placed Maxillary Canine and Mandibular Premolar Impaction – A Rare Case Report

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## Abstract

Very few cases have been presented in literature where one canine is palatally impacted while the other is highly placed in the maxillary arch. There is very less literature about this rare phenomenon. In this case report, identification techniques and different treatment options are presented along with the treatment results of a patient diagnosed with a palatally impacted maxillary canine with ipsilateral highly placed canine along with impaction of a mandibular premolar. This rare condition usually requires extraction of the involved teeth because orthodontic forces alone are unsuccessful in guiding these teeth into their proper location. The treatment protocol for this patient involved a combination of orthodontic procedures and surgical extractions. The aim of this article is to present a case in which there was a palatally impacted left maxillary canine with ipsilateral canine highly placed and unilateral mandibular impacted premolar. A team made up of an orthodontist and oral surgeon, started the case and finished it with an acceptable aesthetic and functional result.

## Keywords

Impacted Canines; Self-Ligating Brackets; CBCT

## Introduction

Impaction is defined as the failure of a tooth to erupt into the dental arch after its normal age of eruption [1]. Third molars, maxillary canines, exhibit the highest 1% to 3% incidence, with a 2:1 female to male ratio [2]. Etiology related to impaction can be divided into systemic and local factors. Crowding, eruption barriers, abnormal position of tooth bud, early loss or prolonged retention of a deciduous tooth, dental trauma, and ankylosis are the local factors [3-6]. Systemic factors include cleidocranial dysplasia as the most common syndrome for tooth impaction [7]. In this syndrome, the patient has a numerous number of impacted teeth. Most of the teeth formed exhibit poor enamel maturation. The maxillary canine can be impacted

in the buccal or palatal region. Etiology for both these impactions is totally different and opposite. Highly placed

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canines are seen in cases of severe crowding as there is no space for the canine to erupt (maxillary canine is the last tooth to erupt). Palatal impactions are due to the long route the canine has to take to erupt in the oral cavity and also due to over retained deciduous teeth. Seeing both these impactions in the same case with an additional impaction in the mandibular arch is a rare feat. Different treatment modalities have been proposed by many authors depending on their skill and experience. The aim of this article was to present a case in which there was a palatally impacted right maxillary canine with ipsilateral canine highly placed and unilateral mandibular impacted premolar. An acceptable result was achieved and a complicated malocclusion was resolved which avoided post orthodontic restorations and improved the aesthetics as well as functions.

### Case Report

A 15 years old female patient came with a chief complaint of irregularly placed upper front teeth. She had no relevant medical and family history. The patient was mesomorphic, mesocephalic, had a convex profile with a posterior facial divergence. She had competent lips and a pleasing appearance. Transverse and vertical proportions were symmetrical. On intra oral examination patient had an Angles Class II molar relation on both sides (Figure 1). The left maxillary canine was highly placed. Lower midline was deviated to the left by 6 mm. Over jet and over bite was normal. A bulge was present on the palatal aspect of the right maxillary premolar region and lingual aspect of the mandibular left molar. OPG showed impacted right maxillary canine and mandibular left second premolar (Figure 2). Cephalometric readings were normal. To locate the exact position of the impacted teeth the patient was advised to take a CBCT scan as well. On the evaluation of the CBCT scan it was clear that the maxillary canine was palatally impacted and it was a favorable impaction (Figure 3). The mandibular second premolar was present between the first premolar and molar.

**Figure 1:** Extra Oral and Intra Oral Photos



**Figure 2:** OPG and Lateral Cephalogram



**Figure 3:** CBCT Images



### Treatment Plan

The patient presented with the following problem list - Class II molar relation, shifted lower midline, impacted right maxillary canine, impacted mandibular left second premolar and highly placed maxillary left canine. Treatment objectives were as follows -achieve an aesthetic profile, correction of crowding in the maxillary anterior region, correction of impacted teeth, correction of highly placed canine and correction of midlines. The extraction of both maxillary first premolars was planned along with extraction of the impacted mandibular second premolar. The position of the mandibular second premolar was unfavorable. Also if the first premolar was extracted, the eruption of the impacted tooth may have lead to mesial movement of the molar. The molar relation was already Class II and hence the second premolar was extracted. Another treatment plan was to extract the impacted canine and reshape the first maxillary right premolar as a canine. The risks involved in extracting the canine were explained to the patient. The patient agreed with the first treatment plan. The extractions were done and the case was bonded using "Smartclip" self-ligating brackets MBT 0.022 slot (3M Unitec). Anchorage preparation was done in the maxillary arch by using a Transpalatal arch. Levelling and

alignment was done in 5 months starting with the sequence of 0.014 Niti wires progressing towards 19X25 SS wires. The highly placed canine was brought into the arch by using the piggy back technique till the main arch wire could be placed in the "Smartclip" bracket slot. Space was maintained on the right side for the canine by putting an open coil spring between the lateral incisor and the second premolar.

### Treatment Progress

Once the levelling and alignment was done sufficient space was created for the impacted maxillary canine. A full thickness mucoperiosteal palatal flap was raised and the impacted canine was exposed. An attachment was bonded on the canine with a ligature wire sticking out (Figure 4). The flap was sutured up and force was activated for moving the canine into the arch. Once sufficient crown length of the canine had erupted in the oral cavity a Ballista spring was used to pull the tooth into the arch (Figure 5). This spring was made with 0.014 Australian wire.. Once the canine was near the line of occlusion the attachment was debonded and then the "Smartclip" self-ligating bracket was bonded on it. Again the piggy back technique was used to bring the canine into the arch. Glass ionomer cement was placed on the lower molars to act as a bite opening mechanism to facilitate the jumping of the canine from the palatal to the buccal side (Figure 6). Once the canine had jumped the bite GIC was removed and finishing and detailing was done. The whole treatment time took 18 months from the day of bonding. The case was finished with Class II molar relation on both sides (Figure 7). The maxillary left molar was in a mild cross bite relation. This occurred due to the use of GIC for bite opening. The canine relation was Class I on the right side and Class II on the left side. The midlines could not be matched due to the asymmetrical extraction of the impacted mandibular second premolar. OPG and CBCT scan showed moderate root resorption of the maxillary canine teeth (Figure 8). Ideal overjet and over bite was seen. The patient was very happy with the result and her new smile

**Figure 4:** Palatal Canine Exposure and Bonding



**Figure 5:** Ballista Spring



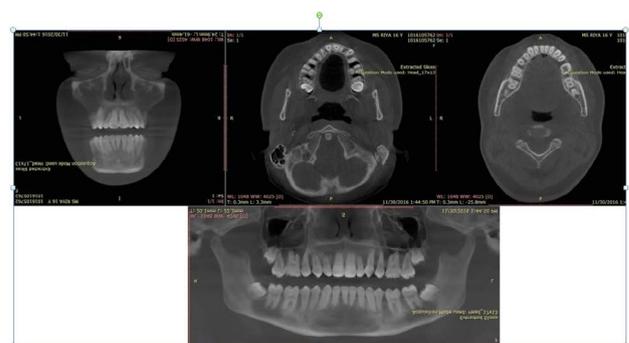
**Figure 6:** Mid-Treatment Photos



**Figure 7:** Post Treatment Photos



**Figure 8:** Post Treatment OPG and CBCT Scan



## Discussion

Simultaneous impactions of the maxillary canine with a highly placed ipsilateral canine and impacted mandibular premolar are a rare clinical situation and is often difficult to treat. In this case, making an appropriate treatment plan for the impacted teeth was very challenging and we knew somewhere we will have to compromise the treatment. Accurately locating the relative positions of the impacted teeth was essential in making the treatment plan. The panoramic and cephalometric films, in this case, could not show the exact position of the impacted teeth. The CBCT scan provided three-dimensional images for accurate position and evaluation of the structure of the impacted teeth, thereby helping in precise surgical and orthodontic management [8-10]. The impacted teeth were well formed and had full-length roots. We had planned for the guided eruption of the impacted teeth 13 and highly placed 23 which will eliminate any post orthodontic restorations. With the help of an Oral Surgeon, a proper surgically designed treatment plan was made with sound orthodontic mechanics. Risks involved in this treatment plan were informed to the patient and her family before any treatment had started. The most aggressive method for treating the impacted teeth 13 and 35 was by surgical extraction. In this case, the extraction of the impacted teeth would require a very delicate technique and cautious management to reduce any risk of injury to the adjacent teeth and structures. The decision on whether to extract the impacted teeth also depends on whether an arch perimeter deficiency exists. A gross arch length discrepancy would favour an extraction method of treatment anyway [11-12].

The extraction of the deciduous canine early in age may prevent impaction of a palatally displaced permanent canine [13]. This theory had been proposed at first on the basis of the fact that the presence of the deciduous canine may be an eruption barrier for the permanent canine [14]. This hypothesis has not yet received any scientific evaluation yet in literature [11]. Different authors have different findings from their studies [7, 9, 10]. Few studies have provided proof that the removal of the deciduous canine may not be an important factor for the successful eruption of the impacted canine [6, 8]. In some cases, it has been shown that palatally impacted canines erupted spontaneously in the absence of any interceptive intervention or tooth removal.

In evaluating the rates of canine movement, one study revealed that a conventional canine moves 0.75 mm/

month while a corticotomy assisted one moves at the rate of 1.06mm/month [15]. The corticotomy assisted palatal canine retraction procedure was informed to the patient in order for a lesser treatment time. The patient refused for the corticotomy and opted for conventional means. Some amount of root resorption is always seen when an impacted canine is brought into the arch. The main reason for this resorption is due to excessive forces and a large distance moved by the canine through bone [8]. The palatally impacted canines on an average have to move at least 10-12mm in order to reach their ideal location in the arch [9,11]. Due to this long pathway root resorption is likely to occur. In this case, some amount is seen in the acceptable norms.

## Conclusion

A multidisciplinary treatment plan involving surgical exposure, traction of a palatally impacted maxillary canine, surgical extraction of an impacted mandibular second molar, full orthodontic appliance treatment in the maxillary and mandibular arches was required to provide this patient with a good aesthetic and functional result. This result could not have been achieved by orthodontics alone. Few treatment results could not be achieved completely. At the end of the day a well balanced occlusion along with acceptable aesthetics is acceptable for difficult cases.

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