



## Orthodontic Management of Bilateral Palatal Impaction of Maxillary Canines in an Adult Female

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### Abstract

Maxillary canines are the commonest teeth to be impacted, after the third molars and the occurrence is more in females than in males. When unerupted they may increase the risk of developing a cystic lesion or can cause root resorption of the lateral incisors. Therefore, when any permanent tooth is clinically missing a panoramic radiographic examination along with an occlusal radiograph is essential. Selection of the appropriate treatment option depends on the etiological factors, space requirements, need for extractions of primary teeth, degree of impaction, and root formation of the impacted tooth. This case report describes the management of a case of an adult female with bilateral impaction of canine and second premolar in maxillary arch along with bilateral mandibular second premolar impaction.

**Keywords:** Maxillary Canines; Teeth; Female

### Introduction

The orthodontic treatment of impacted maxillary canine remains a challenge to today's clinicians. The effort involved in treating canine impaction are mostly overlooked and under emphasized due to highly satisfying results mostly achieved with such cases, making the other person believe that canine must have been in this position since the beginning, completely overlooking the hard work put in to treat such cases. The tooth is said to be impacted if it fails to erupt in the oral cavity from its deep bony position past its root formation and radiographic evidence shows that further eruption will not take place. Moreover palatal displacement of the maxillary canine during its long path of eruption and its failure to change its position between 8-10 years of age may lead to potential impaction [1,2]. The permanent canines are called "cornerstones"

of the mouth because they separate the premolars from incisors and create a balanced smile and provide dual function as they complement both incisors and premolars during mastication [3]. Absence or loss of canines draw attention and cause flattening of face.

### Prevalence and incidence

After the third molars maxillary canines are the most frequency impacted teeth in the dental arch [2]. The prevalence of maxillary canine impaction is in the range of 0.8- 2.8% and the incidences in female population are more than twice from its opposite sex. The maxillary canines are found to be more commonly impacted which is twice in occurrence than the mandibular canines. In the maxilla, the incidence of bilateral impaction of canines is about

8%(4) whereas unilateral impaction is more common. Majority of impacted maxillary canines are located palatally which is almost two-third and only one third are labial [4,5].

### Aetiology

Long path of eruption and the fact that it is the last anterior tooth to erupt in the oral cavity may cause wide spectrum of abnormalities leading to impaction of maxillary canines. Although there is much controversy involved in relation to exact aetiology for the palatally displaced maxillary canines, two schools of thought have emerged, the guidance theory of eruption and the genetic theory [6]. Baccetti [7] observed that anomalies such as enamel hypoplasia, infraocclusion of primary molars, aplasia of second premolars, and small maxillary lateral incisors are the other common findings in patients with palatally impacted maxillary canines. Jacoby [8] studied the patients with impacted maxillary canines and made an observation that there was enough space to erupt in 85% of palatally impacted cuspids, but only 17% of labially impacted cuspids had enough space. So, he concluded primary etiologic factor for labially impacted canines is the arch length tooth size discrepancy.

### Diagnosis

Careful observation of dental eruption status and sequence of tooth eruption are the important parameters and should be recorded along with a measure of crowding or spacing. Clinician should look out for presence/absence of a labial canine bulge or the palatal bulge and any positional abnormality related to lateral incisors such as angulation/rotation that may be indicative of canine impaction [9]. The commonly used X-rays include OPG of maxilla and mandible, occlusal view and IOPA films. Lateral cephalogram, PA cephalogram may be used in selected case. Cone beam computed tomography (CBCT) is one of the most useful investigations in cases of impacted teeth as it provide a virtual reality view of the impacted tooth and its relationship with adjacent teeth and bone.

### Treatment protocol

Treatment protocol for the impacted teeth includes 1. Watchful observation on developing dentition, 2. Intervention which may include extraction of deciduous tooth/removal of physical barrier/creation of enough space, 3. Relocation of impacted tooth

which include surgically assisted orthodontic guidance or surgical autotransplantation and 4. Extraction followed by premolar compensation or prosthetic replacement.

### Treatment

If the patient comes timely and the clinician is more observant and made early diagnosis then prevention/interception of potential impaction is possible. But when relocation of impacted tooth is the only treatment option to bring palatally impacted canines into occlusion, surgically exposing the teeth and placing a bonded attachment to provide orthodontic forces to move the tooth should be done [10]. According to Fournier, *et al.* [11] labially impacted teeth with a favorable vertical position may be treated initially by surgical exposure but without the application of a traction force. He believes that in younger patients the tooth will erupt on its own after surgical exposure, whereas in older patients traction is almost always indicated.

Creating space in the dental arch prior to uncovering the tooth is recommended for two basic reasons. First, if space is not available, the tooth cannot effectively erupt or be positioned in the arch. Second, the edentulous space in the arch provides an adequate zone of attached gingiva to act as a donor site for a partial-thickness apically or laterally positioned flap. Buccally directed force to the canine may cause damage to the incisor roots if the crown of the canine is in close proximity and contact the incisor roots. Hence, various mechanics have been proposed that involve movement of impacted tooth in desired position without damaging incisor roots.

### Case Report

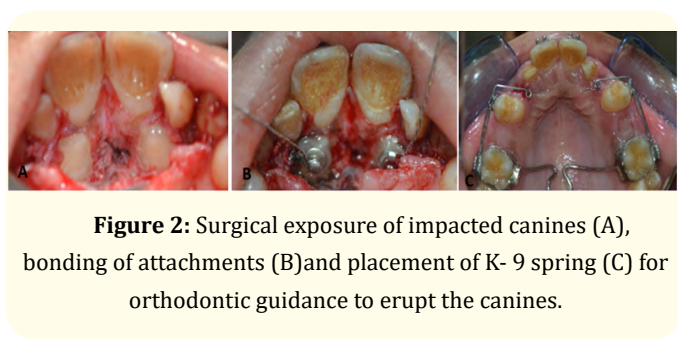
A 18 years old female patient was referred for treatment at Orthodontic and Dentofacial Orthopaedics Department, Faculty of Dental Sciences, King George's Medical University, Lucknow, U.P., India with a chief complaint of irregular teeth. Patient was unaware of impacted teeth and her main concern was irregularity among anterior teeth. Clinical examination revealed bilaterally retained deciduous canines in maxilla, bilaterally retained deciduous second molars in both arches, left second premolar was erupting in lower arch, missing mandibular right central incisor, peg shaped maxillary laterals and a bulge on either side of palate due to palatally impacted canines (Figures 1A-E). Radiographic examination with an Occlusal X ray and orthopantomography (OPG) revealed bilateral

palatal impaction of both canines behind the upper permanent lateral incisors (Figures 1F,G). Canine crowns were located in sector IV according to Ericson and Kural's Sector classification [12] and hence had a poor prognosis for spontaneous eruption after removal of the over retained deciduous canines. Second premolars had good prognosis of eruption in both arches.



**Figure 1:** Pretreatment intraoral (A-E) photographs. Occlusal radiograph (F) and Initial panoramic radiograph (G).

Primary canines and all second primary molars were extracted and permanent canines were surgically exposed with closed flap technique and then lingual buttons with SS ligature wire were attached on the accessible surface of the teeth (Figure 2A, B). The flap was repositioned and ligature wire through a small cut were made available for traction to be applied. K-9 Spring [13] to provide lighter force for orthodontic guidance to erupt the canines were fabricated in .017 × .025 TMA wire. The vertical arm of the K-9 Spring is swung upward and ligated to the SS- ligature wire which has been made available through the flap. Spring was activated by about 2 mm cinch back to produces a gentle extrusion as well as little traction in buccal direction on the canine (Figure 2C).



**Figure 2:** Surgical exposure of impacted canines (A), bonding of attachments (B) and placement of K-9 spring (C) for orthodontic guidance to erupt the canines.

.016×.025 NiTi wire was ligated in mandibular arch for alignment. Because of extraction of retained second primary molars and surgical exposure all second premolars erupted in arch by themselves. After 5 month when canines were erupted sufficiently, bonding was done and canines were ligated with .016 copper niti auxillary wire over .019×.025 SS base wire to complete alignment and leveling in the upper arch. Finishing and detailing were carried out with .017×.025 TMA wire for about three months. For better aesthetics composite build up of peg shaped laterals was done. Patient was further referred to Oral and Maxillofacial Department for extraction of mandibular third molar which has become impacted during the course of treatment. An esthetically pleasing and functionally well-balanced occlusion had been achieved at the end of the treatment.



**Figure 3:** Post-treatment intraoral photograph (A-E), Panoramic radiograph (F).

## Conclusion

The management of impacted canines require a complex undertaking and joint expertise of number of clinicians and is also very important in terms of esthetics and function. Orthodontists must made thorough diagnosis and evaluate the prognosis before hand. Accurate management planning, timely intervention and space management followed by proper execution of light continuous force are the three main factors to determine the success of every impacted case. The results of treatment in this case are quite acceptable and esthetically pleasing and functionally well-balanced occlusion had been achieved at the end of the treatment.

## Bibliography

1. Power SM and Short MB. "An investigation into the response of palatally displaced canines to the removal of deciduous canines and an assessment of factors contributing to a favourable eruption". *British Journal of Orthodontics* 20 (1993): 215-223.
2. Litsas G. "A review of early displaced maxillary canines: Etiology, diagnosis and interceptive treatment". *The Open Dentistry* 5 (2011): 39-47.
3. Richardson G and Russell KA. "A review of impacted permanent maxillary cuspids: Diagnosis and prevention". *Journal of the Canadian Dental Association* 66 (2000): 497-501.
4. Bishara SE. "Impacted maxillary canines: A review". *American Journal of Orthodontics and Dentofacial Orthopedics* 101 (1992): 159-71.
5. Ericson S and Kuroj J. "Early treatment of palatally erupting maxillary canines by extraction of the primary canines". *European Journal of Orthodontics* 10 (1988): 283-295.
6. Richardson G. "A review of impacted permanent maxillary cuspids — diagnosis and prevention". *Journal of the Canadian Dental Association* 66 (2000): 497-501.
7. Baccetti T. "A controlled study of associated dental anomalies". *Angle of Orthodontics* 68 (1998): 267-274.
8. Jacoby H. "The etiology of maxillary canine impactions". *American Journal of Orthodontics and Dentofacial Orthopedics* 84 (1983): 125-132.
9. Ericson S. "Radiographic examination of ectopically erupting maxillary canines". *American Journal of Orthodontics and Dentofacial Orthopedics* 91 (1987): 483-492.
10. Bedoya MM and Park JH. "A review of the diagnosis and management of impacted maxillary canines". *Journal of the American Dental Association* 140 (2009): 1485-1493.
11. Fournier A., et al. "Orthodontic considerations in the treatment of maxillary impacted canines". *American Journal of Orthodontics and Dentofacial Orthopedics* 81 (1982): 236-239.
12. Ericson S and Kural j. "Resorption of maxillary lateral incisor caused by ectopic eruption of canines: a clinical and radiographic analysis of predisposing factors". *American Journal of Orthodontics and Dentofacial Orthopedics* 94 (1988): 503-513.
13. Kalra V. "The K-9 spring for alignment of impacted canines". *Journal of Clinical Orthodontics* 34 (2000): 606-610.

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