



## INTERDISCIPLINARY APPROACH FOR THE MANAGEMENT OF BILATERALLY IMPACTED MAXILLARY CANINES

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**ABSTRACT** Interdisciplinary approach for the management of malocclusion provides a holistic approach of patient management. Prudent treatment planning is necessary to achieve the various treatment goals. This case report describes the orthodontic management of a 14-year-old adolescent female patient with bilateral labially impacted maxillary canines. The problems associated with impacted maxillary canines and the biomechanical interventions used for this patient are discussed. The treatment protocol involved surgical intervention, followed by sequential traction of the impacted teeth. An interdisciplinary approach to treatment with different mechanical strategies led to the achievement of the desired esthetic, functional, and occlusal treatment goals.

**KEYWORDS :** Flap designs, impacted canine, interdisciplinary, orthodontic intervention, sequential traction

### INTRODUCTION:

Eruptive disturbances are alterations of normal tooth eruption, including accelerated, delayed, failed, or deviated in the direction of tooth eruption. Impaction is the total or partial lack of eruption of a tooth well after the normal age of eruption. Between 25% and 50% of the general population are affected by impacted teeth, with the incidence of upper canine impaction reportedly ranging from 0.92% to 4.3%, respectively. Maxillary canine impactions are twice more common in females (1.17%) than in males (0.51%). Eight percent of patients with impacted maxillary canines have bilateral impactions. Impaction of a maxillary canine is a common problem because it has the longest period of development, the deepest area of development and the long eruption path of all the teeth. They are also the teeth that frequently require surgical and orthodontic intervention for their eruption. According to Kokich and Mathews the cause of labial impaction of the canines probably is related to either a retained deciduous tooth, diversion of the canine tooth bud, or idiopathic failure of eruption of unknown origin.

This case report describes the sequential management of bilateral labial canine impaction in the maxillary arch. The treatment success was the result of multidisciplinary treatment approach.

### CASE REPORT:

A 14-year-old female came for orthodontic treatment with the chief complaint of impaired facial esthetics due to irregular upper front teeth. She had a grossly symmetric external facial appearance, mesocephalic head form, euryprosopic facial form with interlabial gape of 3 mm [Figure - 1a,b,c,d]. Intraoral examination [Figure - 2a,b,c,d,e] showed bilaterally retained deciduous canine with unerupted permanent canines and a crowded lower arch with lingually placed lower permanent canines on bilateral sides. In the occlusion, she had normal overbite and a 3 mm overjet. The molar relationship was Class I. The dental midlines were concordant with each other and with the face, and no mandibular shift was detected on closure. There was no relevant history of any medical problem.

Cephalometrically, the patient had a Class I skeletal relationship with normal relationship of maxilla and mandible with underlying skeletal base ( SNA angle- 80°,SNB angle- 78° and ANB angle, 5°). The maxillary and mandibular incisors were mildly proclined (maxillary incisor to NA linear distance- 5mm and angulation 25°, mandibular incisor NB linear distance -4mm and angulation 24° resulting in decreased interincisal angle [Figure 3a,3d,3e and Table 1]. The panoramic radiograph showed all permanent teeth, including the maxillary and mandibular third molars. Both maxillary canines had well-developed roots, were impacted and were mesially angulated and

did not cross the roots of the maxillary lateral incisors. The maxillary left canine was positioned higher and was more severely mesioangulated than the right [Figure 3b]. A vertical tube shift technique with occlusal radiograph and OPG [Figure - 3c] confirmed that both impacted maxillary canines were labially impacted.



Fig-1a

Fig-1b

Fig-1c

Fig-1d



Fig-2a

Fig-2b

Fig-2c



Fig-2d

Fig-2e

### Treatment Objectives And Plan

The objectives of orthodontic treatment for the patient were to erupt the labially impacted maxillary canines, level, and align the arches, obtain normal overjet, and overbite, and achieve a well-intercusped bilateral Class I canine and molar relationship.

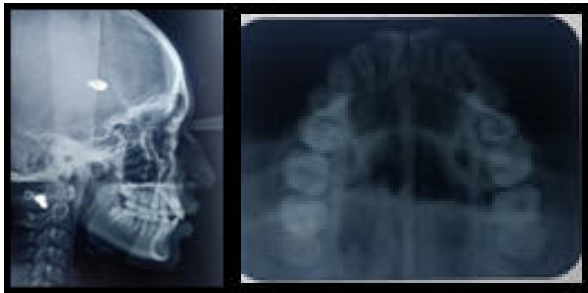
Based on the patient's overall analysis and soft tissue profile, it was determined that a nonextraction orthodontic treatment plan would be the best approach.

It was decided to expose the canines surgically and bond attachments to aid their eruption with light forces.

Along with the upper arch, the lower arch would be bonded, lingually blocked out right and left lower canines would be leveled and interarch finishing achieved with minimal impact on the soft tissue profile

**Table-1**

|                                     |     |
|-------------------------------------|-----|
| SNA                                 | 80° |
| SNB                                 | 78° |
| ANB                                 | 2°  |
| FMA                                 | 25° |
| IMPA                                | 95° |
| Maxillary incisor to NA linear      | 5mm |
| Maxillary incisor to NA angulation  | 25° |
| Mandibular incisor to NB linear     | 4mm |
| Mandibular incisor to NB angulation | 24° |

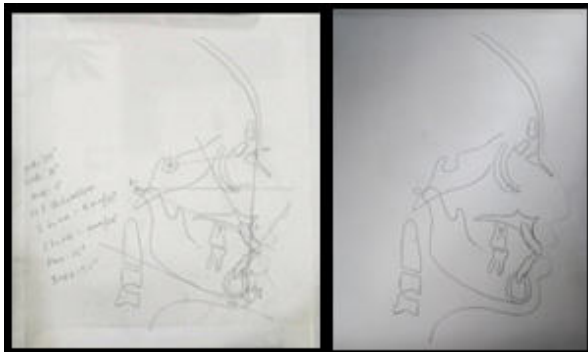


**Fig- 3a**

**Fig- 3b**



**Fig- 3c**



**Fig- 3d**

**Fig- 3e**

**Treatment Progress**

After completing the oral prophylaxis, preadjusted edgewise appliance attachments (0.022 inch slot, MBT prescription) were placed on the maxillary and mandibular dentition. First leveling and alignment of the maxillary and mandibular arch was done sequentially with 0.014”NiTi, 0.016”NiTi, 0.018”SS except the impacted maxillary canines and lingually blocked out mandibular canines. On 0.018”SS coil springs were placed to create space for blocked out mandibular canine after creation of space mandibular canines were bonded and were aligned with the help of 0.014”NiTi.[FIG-4]. After alignment of the maxillary arch both labially impacted maxillary canines were surgically exposed with a wide mucoperiosteal flap, similar to that described in the closed-eruption technique. Bondable buttons were bonded to them, and 0.010 inch stainless steel ligature wires were braided from these buttons [Figure- 5a, 5b]. The surgical flap closure

was carefully done to avoid a poor periodontal mucosal attachment. After 1 week traction was started. Gingivectomy maintaining the biologic with in the region of maxillary left second premolar region [FIG-6a].Routine haemogram and Covid test(RTPCR) [6b,6c] were also done for the patient.



**Fig- 4** Intra Oral Treatment Progress Photo- Upper Arch On Rigid Arch Wire, Lower Arch Space Creation Done With Coil Spring For Blocked Out Canines



**Fig- 5a, 5b** Surgical Exposure Of Right And Left Canines



**Fig-6a** Gingivectomy maintaining the biologic with in the region of maxillary left second premolar region

**Fig-6b- Covid** Test Report- Rtpcr

**Fig-6c** Routine Haemogram Of The Patient

After the crowns of canines moved away from root of lateral incisor, vertical eruption of canines was planned. When the both canines sufficiently moved vertically then canines were bonded (0.022 inch slot), and continuous 0.014 inch nickel-titanium archwire was placed for alignment, which was later replaced by 0.018 inch and 0.018 × 0.025 inch nickel-titanium archwire [Figure - 7]. After proper alignment and leveling, finishing, and detailing was done with 0.019 × 0.025 inch stainless steel archwire with artistic positioning band and individualized torquing for maxillary canines [FIG -7a,7b]. After finishing archwires the occlusion was allowed to settle; then the patient was debonded. Retention was instituted with maxillary and mandibular 3-3 lingual bonded retainers along with removable retainers. Extra orally post treatment patient got a pleasing profile.[FIG- 8a,8b,8c,8d Total active treatment time was 22 months.



**Treatment Result-**

The impacted teeth were positioned into proper alignment with the assistance of direct traction, producing a complete anterior dentition with good alignment of the gingival margins and the improved smile.

Bilateral Class I canine relationships and ideal overjet and overbite were obtained. Periodontal health was not compromised.



Fig-7



Fig- 7a

Fig- 7b



Fig- 8a

Fig- 8b

Fig- 8c

Fig- 8d



Comparison Of Pretreatment And Post Treatment Intraoral Photographs

#### DISCUSSION:

Maxillary permanent canines are important for an attractive smile and are also essential for a functional occlusion. Therefore, extraction of the labially impacted canine is generally contraindicated because it can complicate and compromise the orthodontic result and limit the possibility of providing the patient with a functional occlusion. Impacted maxillary canines most commonly require surgical exposure and orthodontic guidance during eruption.[3] However, bringing an unerupted or impacted maxillary canine into the occlusion should not be the only goal in managing these teeth. The aim should be to attain proper occlusion, a healthy zone of attached gingiva, and ideal alveolar bone height.[7]

In the surgical management of the impacted maxillary canine, the choice of flap was either closed-eruption or an apically positioned flap to expose the tooth. Closed-eruption is the surgical method of choice for very high, labially placed maxillary canines. Labially impacted maxillary teeth uncovered with an apically positioned flap technique have more unesthetic sequelae, such as increased clinical crown length, decreased width of attached tissue, gingival scarring, and intrusive relapse than those uncovered with the closed-eruption technique.[8] The closed-eruption technique used in this patient seemed to be a good surgical choice.

#### CONCLUSION:

Understanding the biologic principles and proper application of the biomechanics enable us to carry out challenging tooth movements. The treatment of bilaterally impacted maxillary canines presented a clinical challenge. A closed-eruption technique and the sequential

traction of the impacted teeth with light orthodontic forces were effective approaches to successfully bring the teeth into occlusion.

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