

# Treatment of Multiple Impacted Canines - Maxillary Left Canine and Both Mandibular Canines: A Case Report

Ranjit O Pawar<sup>1</sup>, Sagar A Mapare<sup>2</sup>

<sup>1</sup>Reader, Department of Orthodontics, Dr. HSRSM Dental College and Hospital, Hingoli, Maharashtra, India, <sup>2</sup>Professor and Head, Department of Orthodontics, Dr. HSRSM Dental College and Hospital, Hingoli, Maharashtra, India

## Abstract

Impaction is the total or partial lack of eruption of a tooth well after the normal age of eruption. In the mandibular arch, the canine impaction can occur due to over-retained deciduous tooth or crowding in the anterior region because of the arch length-tooth material discrepancy. This case report describes the orthodontic treatment of an 18-year-old girl, who had 3 impacted canines (maxillary left and both mandibular canines). The treatment protocol involved leveling and alignment of both upper and lower arches followed by sequential traction of the 3 impacted canines. All the impacted canines were brought to their correct position in maxillary and mandibular arch. The patients smile dramatically improved after orthodontic treatment. A stable occlusion was achieved.

**Key words:** Extrusion, Guidance of impacted teeth, Impaction, Mesiodens, Mucoperiosteal flap, Over-retained deciduous teeth, Periodontium, Supernumerary teeth

## INTRODUCTION

Impaction is the total or partial lack of eruption of a tooth well after the normal age of eruption. The most commonly impacted maxillary tooth is the canine, occurring in less than 2% of the general population,<sup>1</sup> followed by the central incisor with a frequency of 0.06-0.2%.<sup>2</sup> According to Kokich and Mathews,<sup>3</sup> the cause of labial impaction of canines probably is related to either a retained deciduous tooth, diversion of canine tooth bud, or idiopathic failure of eruption of unknown origin. The labial impaction of a maxillary central incisor can occur because of an unerupted mesiodens or supernumerary tooth.<sup>4</sup> In the mandibular arch, the canine impaction can occur due to over-retained deciduous tooth or crowding in the anterior region because of the arch length-tooth material discrepancy.

This case report describes the sequential management of 3 impacted canines (one maxillary and two mandibular). Treatment is done with an interdisciplinary approach, in which an orthodontist and an oral surgeon were involved. The treatment success was the result of the combined efforts of the orthodontist, the oral surgeon, and the patient.

## CASE REPORT

An 18-year-old girl came to the Department of Orthodontics at Nair Hospital Dental College, Mumbai, Maharashtra, India, with a chief complaint of an unesthetic smile due to missing teeth in maxillary and mandibular anterior region. The patient was physically healthy and had no history of medical or dental trauma. No signs or symptoms of temporomandibular joint dysfunction were noted at the initial examination.

The extra-oral examination showed a convex profile due to the retrusive chin. The intra-oral examination showed an Angle's class I malocclusion with spacing in upper left and lower right and left canine region and partially erupted

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**Corresponding Author:** Dr. Ranjit O Pawar, Department of Orthodontics, Dr. HSRSM Dental College and Hospital, Basamba Phata, Akola Road, Hingoli - 431 513, Maharashtra, India. Phone: +91-8806596699/9850350539. E-mail: drranjitpawar@gmail.com

mandibular left first premolar. Three teeth were missing, one maxillary left canine and both mandibular canines. There was no sufficient space for the accommodation of canines in the arch. Overbite was 50-60% with slightly increased curve of spee.

Cephalometrically, the patient had a class II skeletal relationship with slight retrognathism of the mandible (ANB angle, 4°). The panoramic radiograph showed all permanent teeth including the maxillary and mandibular third molar buds. The maxillary left canine and both mandibular canines were impacted. Periapical radiographs were taken with the Clark's tube-shift technique to confirm the labial position of the impacted teeth.

### Treatment Objectives

Ideally, the treatment objectives would include full resolution of the malocclusion of the all 3 impacted canines and partially erupted left mandibular first premolar in the dental arch. Alternative treatment plans with less ambitious objectives were presented to the patient for consideration.

### Treatment Alternatives

The following treatment alternatives were considered.

1. Forced eruption and alignment with surgical intervention of the impacted teeth in the dental arch, which would be the ideal treatment option for this case.
2. Extraction of all impacted teeth and replacement with conventional prosthesis or implants. However, the loss of alveolar bone after several extractions could be detrimental to the esthetics of the future prosthesis.

### Treatment Progress

Finally, it was decided to attempt forced eruption and alignment of the impacted teeth. Both a periodontist and an oral surgeon were consulted to formulate the treatment plan. The patient was asked to sign the consent form.

The maxillary and mandibular molars were banded, and the remaining teeth were bonded with a  $0.022 \times 0.025$  in pre-adjusted appliance. After the initial leveling and alignment, a  $0.019 \times 0.025$  stainless steel archwire was inserted in the maxillary and mandibular arch with an open coil spring in the position of the impacted teeth to hold, and if necessary, create space for its eruption.

After gaining sufficient space for the impacted canines, the patient was referred to the oral surgeon for the surgical procedures of the initial treatment plan. A wide mucoperiosteal flap, similar to that described in closed-eruption technique was raised over the impacted canines.<sup>3</sup> A Begg bracket was bonded on the labial surface of all the impacted canines. The flap was returned to the same position and sutured, living a tied 0.010-in ligature wire protruding through the mucosa and attached to the base arch wire. After a week, a light force of 60-90 g was applied by an elastomeric chain from the ligature wire to the impacted canines. Later, during final alignment, pre-adjusted edgewise brackets were bonded on the erupted canines. After final leveling and alignment, debonding done and removable retainers were given to the patient.

### RESULTS

The overall active treatment duration was 24 months. All the impacted canines were brought into their correct position in the dental arch. The partially erupted mandibular left first premolar was also corrected. The final occlusion was good and stable, except for the mandibular right canine, which finished toward an end-to-end relationship. Periodontal examination showed that there was mild to moderate gingival recession with respect to a mandibular left canine with slight root exposure. However, still there was a dramatic improvement in patient's smile. The pre-treatment and post-treatment extra-oral and intra-oral photographs are shown in Figures 1 and 2, respectively.

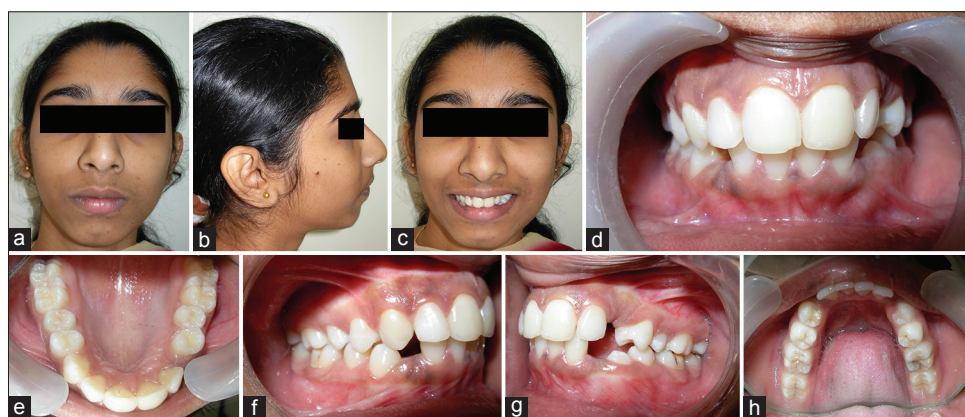


Figure 1: (a-h) Pre-treatment facial and intraoral photographs

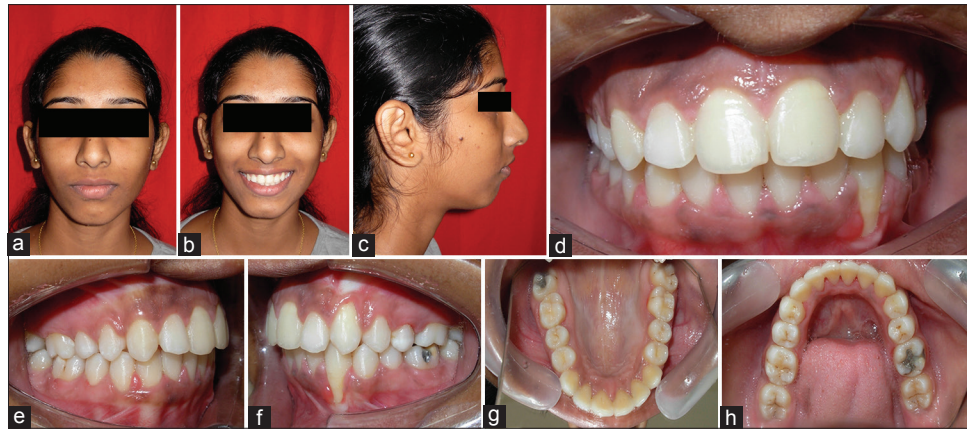


Figure 2: (a-h) Post-treatment facial and intraoral photographs

## DISCUSSION

Several reports have indicated that the impacted teeth can be brought to proper alignment in the dental arch,<sup>5,6</sup> however, only a few have dealt with as many impacted canines as seen in this patient.<sup>7,8</sup> It has been suggested that, in up to 75% of patients, impacted teeth erupt spontaneously after removal of over-retained or supernumerary teeth. Most commonly, supernumerary teeth occur in the anterior midline, and because of their additional tooth bulk, frequently cause malposition of adjacent teeth or prevent their eruption.<sup>9</sup> When spontaneous eruption does not occur, surgical exposure is indicated.<sup>10</sup> Power and Short<sup>11</sup> showed that, of 22 impacted maxillary canines that overlapped the lateral incisors up to half the root width, 16 normalized into a normal eruptive position after removal of the deciduous canines. The surgical exposure for the orthodontic guidance of impacted teeth must be well planned to prevent any harmful effects on the periodontium. The patients post-treatment periodontal status showed satisfactory gingival contours and oral hygiene, except for the mandibular left canine, where there was mild to moderate gingival recession, which may be attributed to trauma from occlusion or improper positioning of the mucoperiosteal flap during surgical exposure.

## CONCLUSION

1. The treatment of multiple impacted teeth was a clinical challenge. The prosthodontic option was less

time-consuming but less attractive than the purely orthodontic solution. A conservative flap design, coupled with sequential extrusion of impacted teeth with a light force, helped us to achieve the desired results.

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