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## Case Report

### ORTHODONTIC REHABILITATION THROUGH A MULTI-FACETED APPROACH – A CASE REPORT

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#### ABSTRACT

In this modern orthodontic era, smile aesthetics determines the success of any orthodontic treatment as it has an impact on the patient's quality of life. The esthetics is compromised when there is a missing, malformed or impacted anterior tooth. The greatest challenge is arriving at a treatment plan when confronted with a case which has the combination of all the above-mentioned abnormalities. Approaching such cases require a comprehensive treatment plan which contemplates the options of whether to extract and replace it with prosthesis or to expose the canine and orthodontically align the teeth. This case report describes an effective management of a 25-year old male patient with impacted canines, malformed and missing lateral incisors through a multifaceted approach. Substituting the lateral incisors amended the smile esthetics of the patient. At the end of 20 months of multi-faceted treatment, the results were superior in terms of esthetics, functional efficiency and patient comfort.

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#### INTRODUCTION

Following third molars, the maxillary canines are the most commonly impacted teeth having a prevalence rate of 1% to 4% [1-3]. The treatment of impacted canines is multifaceted, and it requires methodical diagnosis and coordination between orthodontist, oral surgeon and periodontist. In addition to impacted canines, agenesis of lateral incisors poses substantial complication to the treatment plan. Strang emphasized that when there is agenesis of lateral incisors and presence of impacted canines, the best choice is to create space for the prosthetic replacement of lateral incisors [4]. However, Carlson differed and considered lateralization as the best option [5]. Absence or extraction of any of permanent canines can have its detrimental effect on the occlusion, due to the loss of canine guided occlusion [6]. In these cases, a harmonized occlusion can be established by orthodontically moving the 1<sup>st</sup> bicuspid in the place of missing canine and by establishing a group function.

This article discusses a case report on multiple canine impactions, missing and malformed lateral incisor with retained deciduous teeth which was successfully treated. This is a rare case scenario, wherein all 1<sup>st</sup> bicuspid were converted to canines and the maxillary canines were converted to lateral incisors thus restoring the smile esthetics and establishing a functional occlusion.

##### Case History

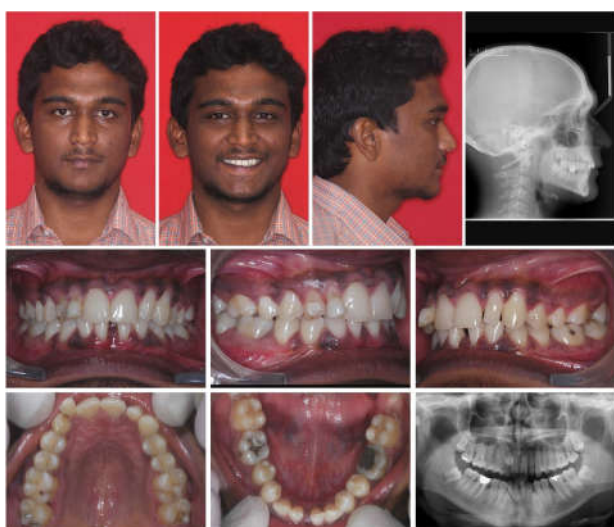
A 25-year-old male patient presented with a chief complaint of maligned, malformed upper front teeth and presence of spacing in lower front teeth. He had no relevant medical history and the dental history revealed that he had underwent some endodontic restorations, with no history of dental extractions.

Clinical and photographic evaluation revealed a mesocephalic head type, mesoprosopic facial pattern, straight profile, straight divergence, average nasolabial angle, average clinical FMA with a non-consonant smile arc. Intraoral evaluation revealed clinically missing canines in the I, III and IV quadrants, missing 12, retained right upper deciduous lateral and canine which exhibited grade I mobility and presence of midline

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spacing in the lower arch. The upper left lateral was malformed with a peg-shaped appearance. Bilateral Class I molar relationship with class I incisor relationship was evident. The patient had an average overjet of 2mm and increased overbite of 4mm (Fig 1).



**Figure 1** Pre-treatment photographs and radiographs

Model analysis revealed an arch length – tooth material discrepancy. Cephalometric evaluation revealed a class I skeletal base with ANB of 2° on an average mandibular plane angle (FMA = 25°). The Orthopantomogram confirmed the presence of retained deciduous 52 and 53, impacted 13, 33 and 43 with agenesis of 12. The extent of the root resorption of 52 and 53 couldn't be established. But considering they exhibited mobility, it can be assumed that there was resorption. The OPG revealed that 33 and 43 were rotated and did not exhibit a favorable labio-lingual position for forced eruption. However, the angulation of the 13 to midline was favorable for forced eruption.

Based on the combined clinical, photographic, radiographic findings the diagnosis was arrived as Angle's class I dentoalveolar malocclusion on a class I skeletal base on an average mandibular plane angle with retained deciduous 52, 53, impacted 13,33,43, agenesis of 12, peg laterals in relation to 22, midline spacing in the lower anterior region with average overjet and increased overbite.

### Treatment objectives

The objectives of treatment were to improve the smile esthetics, to attain a functional occlusion with ideal overjet and overbite without compromising on the facial appearance. The treatment goal was to establish a group functional occlusion to harmonize the stomatognathic system.

### Treatment Modalities

Various treatment modalities were put forth to the patient which included

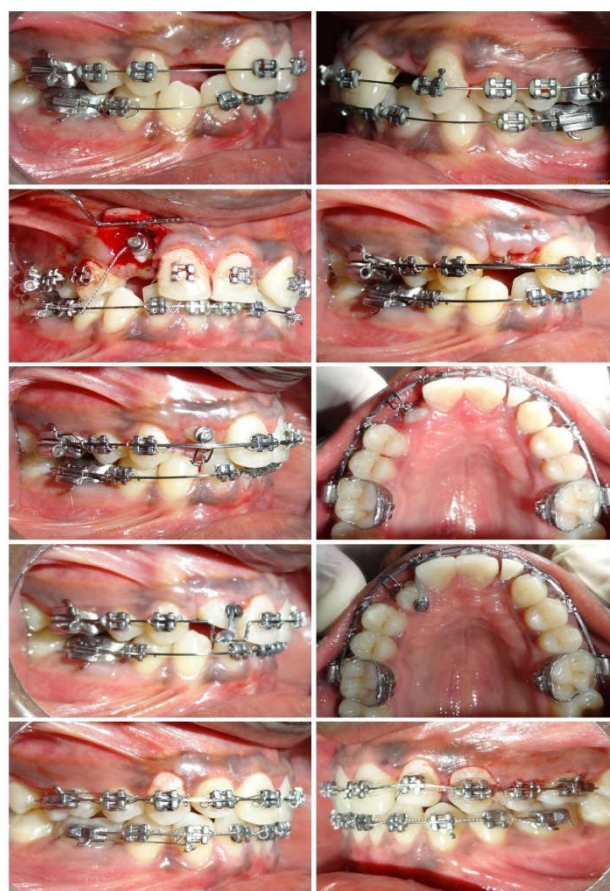
1. extraction of the impacted canines and retained deciduous followed by prosthetic rehabilitation.
2. Extraction of impacted lower canines, retained deciduous and malformed 22 combined with surgical exposure of 13 followed by lateralization of the maxillary cuspids and conversion to 1<sup>st</sup> bicuspid to canines in all IV quadrants.

The patient felt the latter option was better as it was cost effective and had more longevity than prosthetics.

### Treatment Progress

Fixed orthodontic treatment was initiated after the planned extractions. The patient was strapped up with 0.022 × 0.028 MBT prescription. To maintain the space created by extraction, an acrylic riding pontic was given in relation to 12 and 22 which was gradually trimmed mesio-distally to enable bodily translation of maxillary canines.

At the end of initial leveling and aligning, closed eruption technique was initiated for 13. A disimpaction spring with gingival offset and a box in relation to #13 was fabricated from 0.016" AJ Wilcock stainless steel wire to provide lateral and vertical eruptive force. The spring was engaged piggyback on a 0.017 X 0.025-inch SS base archwire. The box placed occlusally was pulled and engaged to the button on 13 through a stainless-steel ligature wire. Light orthodontic traction from the bonded attachment was given to the spring after 6 days of the surgical exposure. The tip of the canine was visible at the end of 25 days. The position of the canine was palatal, and away from the arch. At this juncture, a button was bonded to the palatal surface and medial traction was given to the base arch wire. When one-third of the canine crown was visible the spring was removed, and the canine attachment was secured to .017 X .025-inch SS main archwire. A vertical step was given in the archwire so that distance from the attachment increases and so does the eruptive force to the canine. After the canines were aligned, it was contoured, and lateral bracket was bonded on the canine followed by closure of residual spaces.



**Figure 2** During treatment photographic records

The palatal cusps of the upper 1<sup>st</sup> premolars were recontoured to achieve group function movements. Gingivectomy was carried out on the 1<sup>st</sup> premolars and upper canines so that they mimic the canines and lateral incisors respectively. Settling was carried out prior to debonding (Fig 2).

## RESULTS

At the end of 20 months of combined surgical-orthodontic-periodontal treatment, the appliance was debonded and retainers were placed. The patient was finished in a class I molar relationship with a functional class I canine relationship. The smile esthetics of the patient had improved without compromising on the soft tissue profile. Radiographically, there were no signs of root resorption with standard root parallelism (Fig 3).

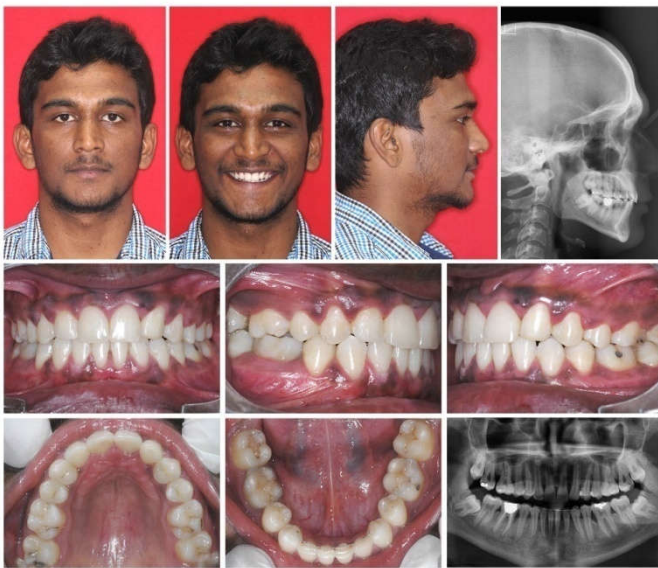


Figure 3 Post-treatment photographs and radiographs

## DISCUSSION

Factors like agenesis of lateral incisor, variation in the size of crown or root of lateral incisor, timing of the root formation predisposes canine for impaction. It has been suggested that presence of precise length of lateral incisor root at the exact time is an imperative variable in guiding the canine to eruption [7-9].

While providing a superior esthetic result, it must be always considered to conserve as many natural teeth as possible and that no prosthetic replacement is superior to natural tooth in terms of esthetics and longevity. While erupting a labially impacted canines, care must be taken to erupt the canine to the center of the ridge and not far too labially because it may cause gingival recession and bony dehiscence and the traction should mimic normal eruptive pattern. Closed eruption is preferred technique in unravelling an impacted canine so that appropriate crown length is maintained. Also, it is suggested that with apically repositioned flap technique, the teeth try to re-intrude after active orthodontic treatment [10].

The decision to extract the mandibular canines was arrived at after meticulous planning. The teeth were rotated which would complicate the treatment biomechanics. Considering the position of mandibular canines, it would require heavier force to erupt, which may predispose the adjacent anteriors to root resorption.

The next positive aspect of the case is establishment of balanced occlusion. According to Thompson [11], components of the stomatognathic system must be studied with same interest that has been given to esthetics. One of the key factors in protection of the stomatognathic system is maintenance or establishing a group function which was achieved by replacement of canines by the bicuspid.

## CONCLUSION

In the reported case, establishing a group function and substituting lateral incisors has proved effective in establishing both functional and esthetic harmony in a short duration of time. Patients appearance improved considerably, and the patient was more confident in terms of social interaction.

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