

# Orthodontic management of missing maxillary lateral incisors: A case report

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## ABSTRACT

The maxillary lateral incisor agenesis affects the quality of life and self-esteem of individuals. For these patients, there are two possible treatment options: either closing the space and using the canine as a lateral incisor or opening the space and using the prosthesis instead. The choice of treatment depends on the proper diagnosis of the case. In this case report, a patient with skeletal class II malocclusion, Angle's class II molar relationship, and spacing in the maxillary arch due to missing lateral incisors is described. The patient's main complaint was a gap in the upper front area of the jaw, which was successfully treated with orthodontic space closure and a restorative procedure.

**KEYWORDS:** canine lateralization, composite veneering, hypodontia

## INTRODUCTION

Hypodontia of the lateral incisor is found in 3% of the population.<sup>1</sup> The gap due to missing maxillary lateral incisors has a detrimental effect on the Oral Health-Related Quality of Life and self-esteem of patients.<sup>2</sup> Orthodontic management of such patients includes two options; creation of space followed by placement of prosthesis and space closure with canine lateralization.<sup>3</sup> The choice between the two alternatives is dependent on the size, shape, and colour of the canine, the age of the patient, tooth size arch length discrepancy, existing occlusion, the patient's expectations for the course of therapy, and cooperation of the patient.<sup>4</sup>

Although orthodontists and dentists rank prostheses and substitution of canines as equally pleasing, laypersons prefer closure of space.<sup>5</sup> In the orthodontic method of space closure, the canine is substituted as lateral incisor and the first premolar is substituted as canine. Bracket choices for canine for substitution cases include maxillary central incisor, maxillary lateral incisor, flipped (180°) maxillary canine, and flipped (180°) mandibular second premolar brackets.<sup>6</sup> Here we present a case report of missing maxillary lateral incisors and interdisciplinary management of the case.

## CASE REPORT

A 17-year-old male patient came to the Department of Orthodontics with a chief complaint of a "gap present in the upper front region of the jaw." On clinical examination (Fig 1), the profile of the patient was convex, with anterior facial divergence, normal nasolabial angle, competent lips, and normal mento-labial sulcus. On soft tissue examination (Fig 2), the frenal attachment was mucosal. The number of teeth that were clinically present on hard tissue examination was twenty-six with missing 12 and 22; unerupted third molars and scissor bite w.r.t. 15, 24 and 25. On maxillary arch examination, the shape of the arch was oval, asymmetrical, mesially angulated 11 and 21, with distopalatal rotation of 14 and 24, mesiopalatal rotation of 15 and 25, and the presence of anterior spacing. On mandibular arch examination, the arch's shape was oval, asymmetrical, with minimal anterior crowding, mesiolingual rotation of 45, lingually placed 42, lingually tilted 45 and restoration was present w.r.t. 36. Maximum mouth opening was 41 mm, free-way space 1.5 mm, the curve of Spee 4 mm, molar relation end-on bilaterally, canine relation end-on bilaterally, incisor relation Class I, overjet 4mm and overbite 4mm (44.4%). The upper dental midline was 1mm to the left of the facial midline, which coincided with the lower dental midline.



Fig 1: Extra-oral photographs taken before treatment



Fig 2: Intraoral photographs taken before treatment

On smile analysis, the lip line was suggestive of an average smile, smile arc was non-consonant, upper lip curvature straight, smile style cuspid, buccal corridor present, the zenith of 11 was more occlusally located than 21, of 23 was more gingivally located than 21 and the upper central incisor had a square shape with golden standard of 100%. On radiographic examination, there

were missing 12, and 22 on orthopantomogram (OPG), and lateral cephalogram revealed Cervical Vertebrae Maturation (CVM) stage 5 (Fig 3). It was diagnosed as a case of skeletal class II (ANB= 6°) with a horizontal growth pattern (SN-GoGn=26°) with Angle's Class II division 1 malocclusion with slightly protrusive upper and lower lips.

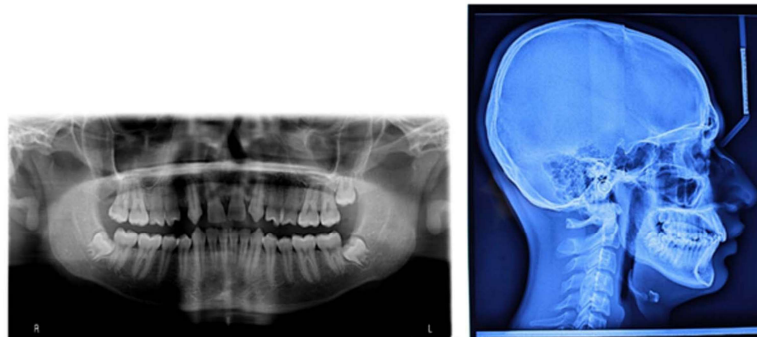


Fig 3: Radiographs before treatment

Since the patient had skeletal class II malocclusion and was in CVM stage 5, growth modification was not an option; thus, orthodontic camouflage was planned because the patient's malocclusion was not severe.

Treatment options available for the patient were:  
(1) Creation of space for upper lateral incisors followed by replacement with prostheses.  
(2) Canine lateralization and orthodontic space closure.

Orthodontic space closure by lateralization of canine was the preferred treatment option in this patient because the patient was young, had an acceptable profile, minimal mandibular crowding, and prosthetic replacement was not required in this mode of treatment which could lead to the accumulation of plaque and impaired periodontal health. Mesial movement of the canine would preserve the alveolar bone height in the incisor region and also would result in the permanence of the finished result. Bracket positioning was done according to MBT individualized bracket positioning chart in 0.022" bracket slot. In both the upper and lower arches, 0.014" NiTi, 0.016" NiTi, and lastly 0.017" x 0.025" NiTi were employed. To create space between the upper first premolar and the first molar, an open coil spring was placed. Anterior bite plane was given to disocclude posterior teeth for correction of deep bite and rotation (Fig 4). Correction of premolar rotation was done through the use of a couple force (Fig 5). Sequential protraction of posterior teeth was done through the use of e-chain and class III elastics of 1/4" diameter and 3.5 oz force (Fig 6). For settling of posterior teeth, posterior box elastics (3/16", 4.5 oz)

were utilized (Fig 7). In order to simulate upper canines like lateral incisors, the canine brackets were inverted to obtain positive torque. Also, restorative veneering was done wrt 13 and 23 to simulate lateral incisor. Similarly, to simulate first upper premolars like canine, palatal cusps were ground wrt 14; 24, and slight mesiopalatal rotation was carried out to hide palatal cusps. Supra-crestal fibrotomy was done wrt 24, 25, 14, and 15, a week before debond to prevent rotational relapse. In both the upper and lower arches, lingual bonded retainers were used. At the end of the treatment, the patient had class II molar and class I canine relationships on both sides. (Fig 8). The parallelism of teeth and normal inclination of incisors were achieved (Fig 9). The closure of spacing in the maxillary anterior region due to the missing maxillary lateral incisors was achieved along with the improvement of the smile and maintenance of the initial profile of the patient at the end of treatment (Fig 10, 11, 12, 13). The total time for completion of treatment was 28 months. Cephalometric superimposition showed protraction of upper molars with slight retraction of upper incisors without much movement of lower incisors and molars (Fig 14, 15, and 16).



Fig 4: Photographs with anterior bite plane during treatment



Fig 5: Couple force applied in upper premolars



Fig 6: Class III elastics ¼" 3.5 oz applied for protraction of upper posteriors



Fig 7: Posterior box elastics 3/16" 4.5 oz



Fig 8: Intraoral photographs with fixed upper and lower retainer after treatment

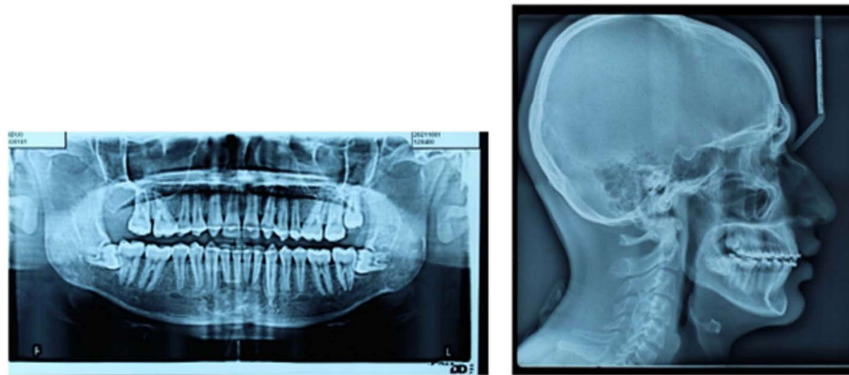


Fig 9: Radiographs after treatment



Fig 10: Extra-oral photographs after treatment



Fig 11: Comparison of intra-oral photographs (a, Initial; b, After completion of orthodontic treatment; c, After the restorative procedure)



Fig 12: Comparison of smile photographs (a, Initial; b, After completion of orthodontic treatment; c, After the restorative procedure)



Fig 13: Comparison of Profile photographs (a, Initial; b, Final)

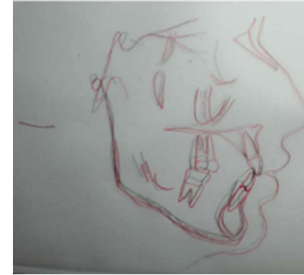


Fig 14: Cranial base superimposition

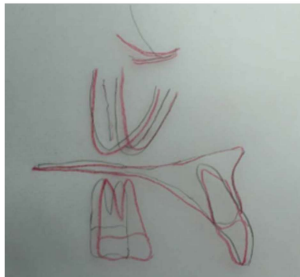


Fig 15: Maxillary superimposition



Fig 16: Mandibular superimposition

## DISCUSSION

The treatment of missing maxillary lateral incisors is challenging. It requires the cooperation of the patients as well as the patience of orthodontists. The decision of whether to open the space followed by replacement with a prosthesis or close the space followed by canine lateralization can be confusing. Orthodontic space closure is favoured if the treatment needs to be completed in young patients, Angle's class II malocclusion, presence of acceptable profile, and uncrowded mandibular arch. The advantages of space closure include the permanence of the finished result, no requirement of the prosthesis, no periodontal impairment, and preservation of alveolar bone height in the incisor region. Orthodontic space opening and replacement with prosthesis is favoured in Angle's class I malocclusion, if there is sufficient room in the maxillary arch, if anterior crossbite is present, if the teeth around the missing lateral incisor gap are parallel to one another, and good buccal interdigitation with class I canine relationship is present. The advantages of this alternative treatment option include achievement of functional occlusion and reduced treatment duration with minimal handling of teeth.<sup>7,8</sup> General dentists favour the restorative solution; orthodontists favour canine substitution; and if the results are the same, parents will typically go for the less expensive option. Thus, Vincent Kokich has stated the decision should be made mutually.<sup>9</sup>

In this case, the orthodontic space closure was the preferred option and the MBT 0.022" slot bracket was

used for the treatment. The rotated upper premolars added complexity to the case which was subjected to Circumferential supracrestal fiberotomy (CSF) one week before debonding. The CSF technique is known to be more effective at reducing relapse.<sup>10</sup> After the completion of orthodontic treatment, a restorative procedure was carried out for canines to simulate the lateral incisors. Paduano et al treated congenitally missing maxillary lateral incisors by opening the space and substituting them with oral implants.<sup>11</sup> Space opening was planned for that case as the molar relation was Angle's class I with good buccal interdigitation unlike our case which had Angle's class II malocclusion with protrusive upper and lower lips.<sup>11</sup> However, Almeida et al and Gassem and Hashem treated cases with missing maxillary incisors by mesialization of canine and posteriors followed by cosmetic rehabilitation of canines into lateral incisors with restorative procedures like our case.<sup>12,13</sup> The longer duration of treatment was due to the patient's inability to follow up regularly because of the COVID-19 lockdown. Also, proper torque gain for substituted lateral incisors was not achieved which is one of the shortcomings of the case.

## CONCLUSION

The choice of treatment can be confusing at times for the agenesis of maxillary incisors. A proper history, clinical examination, and diagnosis can play a crucial role in making the right decision for case management. The quality of treatment results will depend upon the cooperation of the patients as well as the patience of the orthodontists.

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