



Case Report

## A Non-Extraction Management of Highly Placed Maxillary Canine - A Case Report

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### ABSTRACT

Transverse or vertical arch malrelationships such as crowding and local irregularities such as highly placed canine are common causes of Class I malocclusions and are handled usually by extraction or nonextraction treatment in the permanent dentition. In this following case report we used the new invention, a vertical canine by-pass loop for the management of arch length discrepancies as well as to expand the arches and bring down the canine to its original position. The duration of treatment is of 15 months, and the retrognathic profile been improved and the crowding of the upper and lower arches been relieved with not alteration of inter-canine and intermolar width.

**Keywords:** vertical canine by-pass loop, intercanine width, class I malocclusion.

### INTRODUCTION

Transverse or vertical arch malrelationships such as crowding and local irregularities such as highly placed canine are common causes of Class I malocclusions and are handled usually by extraction or nonextraction treatment in the permanent dentition. Considerable controversy still surrounds the question of whether better long-term results are achieved by extraction or by nonextraction therapy. <sup>[1]</sup> A documented criticism of extraction treatment is that it results in narrower dental arches when compared with nonextraction therapy. <sup>[2]</sup> Nonextraction treatments have gained widespread popularity because of the

condylar displacement, <sup>[3]</sup> narrowed smiles accompanied by dark corners, <sup>[4]</sup> dished-in profiles with extractions, <sup>[5]</sup> and suboptimal mandibular growth. <sup>[6]</sup>

Orthodontists are obviously quite concerned about the long-term stability of their treatment. Mechanical expansion of the lower arch has been shown to be unstable. Even the stability of four-first-premolar extraction treatment has been disappointing, and this approach has also been criticized for producing a dished-in profile. Air-rotor stripping or "slenderizing" has been proposed in recent years as a possible alternative to extractions. <sup>[7]</sup>

The maintenance of the pre-treatment values for intercanine and intermolar distances was suggested as the key to post treatment stability because these values were believed to represent a position of muscular balance for the patient.<sup>[8]</sup>

In the following case report we managed finish a moderate crowding case with use proximal stripping and protrusion of incisors without the alteration of intercanine, inter-premolar width and maintaining the facial profile.

## CASE REPORT

An 14-years old female presented to the Department of orthodontics and Dentofacial Orthopedics of M.S. Ramaiah Dental college, Bangalore with problems including high labially placed right maxillary canine, labially placed lower left mandibular canine, and moderate crowding in both upper and lower anterior region and rotated right mandibular premolar teeth.

On clinical examination, the patient exhibited mesocephalic head, obtuse nasolabial angle, competent and slight retrognathic lip position with straight facial profile. (Fig 1)



Fig 1: 14-year-old female patient extra-oral photographs

Intraoral evaluation revealed angle's class I molar relationship bilaterally with moderate crowding in both upper and lower anterior region of the arch along with rotation of second premolar in the lower left region (Fig 2).



Fig 2: 14-year-old female patient with highly placed maxillary canine and moderate upper and lower anterior crowding

Cephalometric examination confirmed the diagnosis of patient with skeletal class I with average growth pattern. (Fig 3)



Fig 3: Cephalometric showing skeletal class I



Fig.4 Patient with vertical canine by-pass loop in place.

Model analysis confirmed the 7.5mm crowding in the upper and 6mm of crowding in the lower arches.

**Treatment plan**

A fixed orthodontic appliance, PEA 0.022" slot brackets were used, for the management of crowding. A proximal stripping was done initially, followed by expansion and proclination. A vertical canine loop was used for the upper anterior teeth and NiTi open coil spring in the lower anterior region.

The vertical canine By-pass loop was made in the 0.018" stainless steel

Australian arch wire, the mesio-distal width of the bracket with 3mm being added, (Fig 4) it will expand and to procline the associated teeth along with it helps in bringing the canine in its position without disturbing its path. Short class II elastics were used to settle the occlusion.

**Treatment Results**

Post-treatment evaluation showed an improvement in the retrognathic profile and lips (fig 5) and the crowding is relieved in both upper and lower arch with maintenance of inter-canine and inter-molar width (Fig 6).

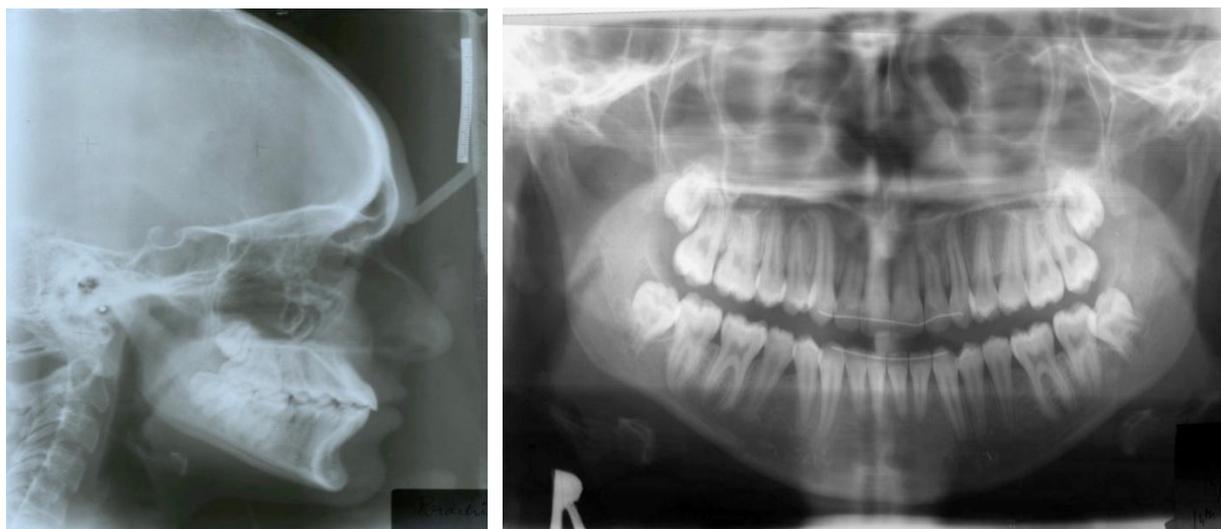


Fig.5. Post-treatment photographs showing improvement in the retrognathic profile



**Fig 6. Post-treatment photographs showing improvement in occlusion**

Post-treatment Cephalometric analysis corroborated with the post-treatment clinical findings. The total treatment duration is of 15 months (Fig 7).



**Fig.7 Post-treatment lateral cephalogram and OPG.**

## **DISCUSSION**

It is well accepted that, during orthodontic treatment involving the extraction of teeth, arch dimensional changes occur and that these dimensions continue to change after active treatment. [9] Riedel stated that arch form, particularly in the mandibular arch, could not be altered by appliance therapy. Intercanine and intermolar widths tend to decrease during the post retention period, especially when expanded during treatment.

Weinberg and Sadowsky, in a retrospective study of Class I malocclusion–treated nonextraction, found significant increases in the mandibular intercanine and intermolar arch widths and stated that the

resolution of the crowding in the nonextraction therapy of Class I malocclusion was achieved by expansion of the buccal segments in mandibular arch. However, among the 30 patients participating in that study, 16 received some kind of palatal expander, which might cause expansion in the mandibular arch. Similar to that study, mandibular intercanine width increased significantly in the nonextraction group in this study. The increase in the mandibular intercanine width in nonextraction patients can be explained by minimal expansion with the archwires. [10]

On the basis of the concepts documented in the literature, one might have expected to find narrower arches after extraction. In contrast to all these findings,

Kim and Gianelly suggested that the widths of both arches of the extraction subjects were 1–2 mm larger when compared with the arch widths of the nonextraction group at a standardized arch depth.

Another important consideration in arch widths is the tooth size arch length discrepancy. <sup>[11]</sup> Studies of extraction vs nonextraction pretreatment variables have reported that the tooth size arch length discrepancy is the most significant factor influencing the extraction decision. <sup>[12]</sup>

However, tooth size arch length discrepancies have been considered not to have any effect on dental arch width changes in many studies. <sup>[13]</sup>

In this study, there was more crowding in the extraction group (26.7 mm for the maxilla and 26.3 mm for the mandible) than in nonextraction group (24.5 mm for the maxilla and 22.1 mm for the mandible). The results showed that after extraction treatment, lower posterior teeth moved mesially into narrower parts of the arch, indicating that anchorage requirements were kept moderate. In the nonextraction group, because of less tooth size arch length discrepancy, the crowding might be treated mostly by the movements of the anterior teeth. The results of this study confirm that extraction treatment does not result in narrower dental arches than nonextraction treatment.

## CONCLUSION

It has been showed in the above mentioned case report that management of highly placed canine and the moderate crowding has been well managed with the non-extraction methods by using a vertical canine By-pass loop with much altering the inter-canine, inter-molar width and with improvement in retrognathic profile condition.

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