

## Case Report

# Orthodontic treatment using segmental T loop for correction of ectopically erupting canine: a case report

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## ABSTRACT

Most of the patients approach the orthodontist with their prime issue being their appearance. The patient expects the treatment to improve their overall appearance which in turn increases the acceptance by their peers. A 14 year old female report with a chief complain of irregularly placed teeth in upper and lower front region of jaw. After detailed diagnosis her treatment was planned wherein over retained 53 was extracted followed by correction of buccally erupting 13 and correction of crowding and improvement in airway was achieved. Titanium molybdenum (TMA) segmental T loop was used to retract 13. Post-treatment records revealed that treatment objectives were achieved and patient was satisfied with the treatment.

**Keywords:** Segmental T loop, Ectopically erupting canine, Frictionless mechanics, Individual canine retraction

## INTRODUCTION

Anterior teeth retraction represents a fundamental phase of fixed orthodontic appliance treatment. Three-dimensional control of anterior teeth movement and correct positioning of teeth are essential for the maintenance of function, aesthetics, and stability of orthodontic treatment.<sup>1</sup> Premolars were chiefly considered for extraction followed by canine retraction.<sup>2-5</sup> Since space closure is a routine procedure in orthodontics, researchers have always tried to find efficient methods for canine retraction.<sup>6</sup> Canines can be retracted by two ways: Frictional (sliding) mechanics and Non frictional (non sliding/loop) mechanics. In the second type, frictionless mechanics, i.e., loops can be fabricated in a segmental or full archwire and closing loops are usually used in loop mechanics for the extraction of space closure. The major advantage of segmental loop mechanics is the lack of friction between the bracket and archwire during space closure. The T-loop has been recognized as an effective means to achieve desired tooth

movement by differential moments between the anterior and posterior segments. From an orthodontist stand point, cases with buccally erupting canine, it's ideal to go for an individual canine retraction followed by anterior retraction. Ectopic buccally erupted maxillary canines are one of the most frequently encountered conditions in orthodontic practice. Buccally ectopic canine eruption occasionally occurs in spite of adequate space in the dental arch. This condition has been defined as "primary tooth germ displacement," meaning that the tooth develops in an aberrant site or with an unusual orientation, presumably due to an abnormal genetic pattern.<sup>7</sup>

## CASE REPORT

A 14 year old female report with a chief complain of irregularly placed teeth in upper and lower front region of jaw. On extra oral examination (Figure 1) patient had a fairly symmetrical face with unequal facial thirds and equal facial fifths, short upper lip, incompetent lips,

average buccal corridors, non-consonant smile and average to vertical growth pattern. 100% display of upper anteriors and 2 mm gingival display. Intra oral examination (Figure 2) revealed a class I molar relationship, over retained 53 and buccally erupting 13, maxillary midline deviated to the left side by 2 mm, crowding with mandibular lower anteriors and slight crowding with maxillary anteriors was seen. Patient had reduced lower airway and erupting 3<sup>rd</sup> molars in all 4 quadrants of jaw (Figure 3). Maxillary incisors were proclined by (U1 to NA=27°), and the mandibular incisors were proclined (L1 to NB=27°). There was no family history of this kind of malocclusion.

**Treatment plan**

After examining the pre-treatment diagnostic records, it was decided for extraction of over retained 53 followed by levelling and aligning of anteriors and correction of canine relation. The anchorage requirement was group A, so to preserve anchorage nance palatal button was planned in upper arch and lingual arch in lower dentition to prevent mesial movement of molars and to achieve enough space for crowding correction and reduce proclination. The rationale was to improve the lower airway, avoid compromising the patient's profile and for a more stable treatment result.

**Treatment progress**

Fixed preadjusted edgewise brackets with 0.018×0.022” MBT slots were placed on all teeth in both arches, with bands on the maxillary and mandibular first molars. Initially bonding was done only on canines and segmental T loop was given after extraction of 53. Segmental T loop of TMA wire (0.016×0.022) was ligated on 13 and inserting the other end of T loop in the accessory slot of maxillary right 1<sup>st</sup> permanent molar tube (Figure 4). Segmental T loop was activated by 2 mm and cinched posterior to right 1<sup>st</sup> permanent molar tube. It took approximately 2-4 months to retract 13. A 0.016” NiTi archwire was engaged in the maxillary and mandibular arch. Slight IPR (Inter proximal reduction) was done with mandibular anteriors to relieve crowding, followed by 0.016×0.022 NiTi for 4-6 weeks, 0.016×0.022 SS for 4-6 weeks. Torque on the maxillary right canine was corrected a few months later by progressing in the maxilla to a 0.017×0.025 SS. Total treatment time was 15 months. Post debonding lingual bonded retainers were given in maxillary and mandibular arch respectively for retention.

**Treatment results**

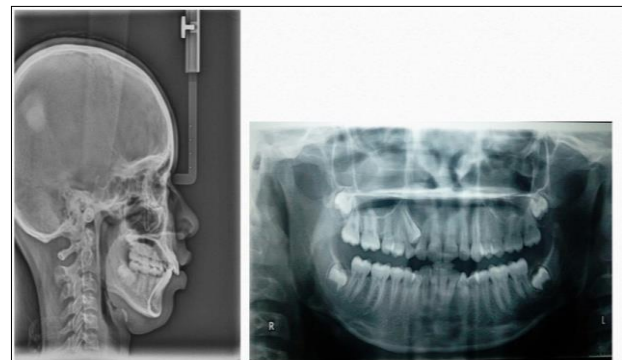
Post-treatment records (Figure 5 and 6) revealed that treatment objectives were achieved, 13 was levelled aligned with class I canine relation bilaterally. Crowding of maxillary and mandibular arch was corrected, ideal overbite and overjet were achieved. Post treatment airway was improved (Figure 7).



**Figure 1: Pre-treatment extra-oral photographs.**



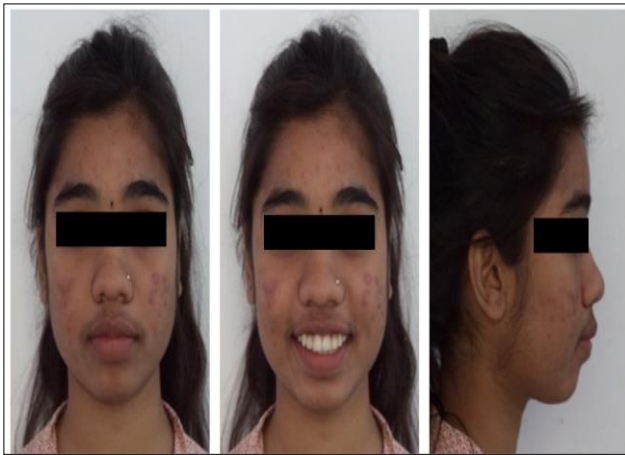
**Figure 2: Pre-treatment intra-oral photographs.**



**Figure 3: Pre-treatment lateral cephalogram and OPG.**



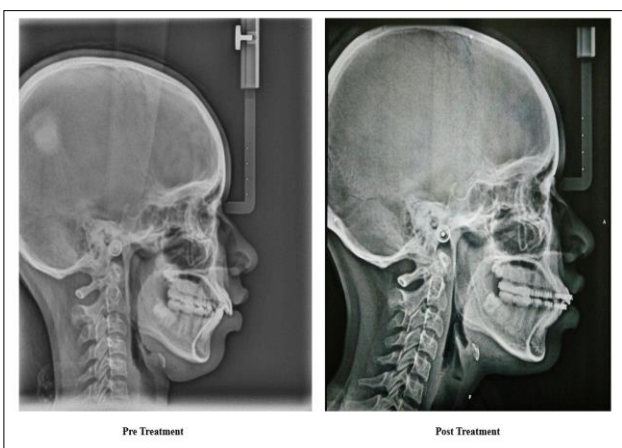
**Figure 4: Segmental T loops of TMA wire (0.016×0.022).**



**Figure 5: Post-treatment extra-oral photographs.**



**Figure 6: Post-treatment intra-oral photographs.**



**Figure 7: Comparative lateral cephalogram.**

## DISCUSSION

The ectopic eruption of the canine may be broadly classified under systemic and local factors. According to McBride, “The failure of permanent teeth to erupt into their normal position in the dental arches is usually due to a discrepancy between tooth size and over-all arch

length.<sup>8</sup> According to Moyers, the maxillary cuspid follows a more difficult and tortuous path of eruption than any other tooth.<sup>9</sup> This may also be one of the factor leading to its displacement out of the arch. Burststone's segmental T-loop if made precisely proves to be effective and efficient in correcting buccally erupting canine. The use of TMA wire and increasing the wire incorporation in T-loop leads to decrease in load-deflection rate. As there is no sliding of the wire in between the brackets, the friction is not involved and hence helps with the anchorage control during the initial canine retraction (Vaidya et al).<sup>10</sup> However, precise control of tooth movement is possible in a predictable manner with the T-loop. This leads to anchorage preservation and increased rate of tooth movement. Periodic panoramic and selective periapical radiographs along with a careful clinical examination that includes intraoral palpation permits early diagnosis of unerupted, ectopic, and potentially impacted permanent canines. When such a diagnosis is apparent, timely interceptive therapy may then be instituted. In the above case reports adequate results were achieved through extraction of over retained 53 followed by levelling and aligning 13 with segmental T loop to achieve more stable results.

## CONCLUSION

The successful treatment of a patient with an ectopic tooth and crowding can be a challenging task for an orthodontist. Proper treatment of an ectopic canine patient with crowding requires a careful treatment planning by the orthodontist. Thus the use of Segmental mechanics is effective as it helps in reducing the unwanted effects of continuous arch mechanics. Individual canine retraction in this case report not only helped in distalization of canine but it also corrected the vertical placement of canine. A precisely made T-loop had adequate tooth control in all three dimensions. Hence, use of segmental T-loop for individual canine retraction in buccally erupting case proved to be effective and efficient method in treatment of crowding and proclination.

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## REFERENCES

1. Braun S, Sjrursen Jr RC, Legan, HL. on the management of extraction sites. Am J Orthodont Dentofacial Orthop. 1997;112(6):645-55.
2. Stalpers MJ, Booij JW, Bronkhorst EM, Kuijpers-Jagtman AM, Katsaros C. Extraction of maxillary first permanent molars in patients with Class II Division 1 malocclusion. Am J Orthod Dentofacial Orthop. 2007;132(3):316-23.
3. Erdinc AE, Nanda RS, Isiksal E. Relapse of anterior crowding in patients treated with extraction and

- nonextraction of premolars. *Am J Orthod Dentofacial Orthop.* 2006;129(6):775-84.
4. Chaushu G, Becker A, Zeltser R, Vasker N, Branski S, Chaushu S. Patients' perceptions of recovery after routine extraction of healthy premolars. *Am J Orthod Dentofacial Orthop.* 2007;131(2):170-5.
  5. Janson G, Busato MC, Henriques JF, de Freitas MR, de Freitas LM. Alignment stability in Class II malocclusion treated with 2-and 4-premolar extraction protocols. *Am J Orthod Dentofacial Orthop.* 2006;130(2):189-95.
  6. Hayashi K, Uechi J, Murata M, Mizoguchi I. Comparison of maxillary canine retraction with sliding mechanics and a retraction spring: A three-dimensional analysis based on a midpalatal orthodontic implant. *Eur J Orthod.* 2004;26(6):585-9.
  7. Becker A. *The orthodontic treatment of impacted teeth.* London: Martin Dunitz Publishers. 1998.
  8. McBride LJ. Traction-A surgical/orthodontic procedure. *Am J Orthod.* 1979;76(3):287-99.
  9. Moyers RE. *Handbook of orthodontics, edition 2,* Chicago. Year Book Medical Publishers, Inc. 1963.
  10. Vaidya M, Jyothikiran H, Raghunath N, Pai P. Extraction versus non-extraction: A retrospective study. *Int J Orthod Rehabil.* 2018;9:23-6.

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