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Ectopically Erupted Canine Treated by Modified Segmented T Loop in Class II Patient- A Case Report

KEYWORDS

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ABSTRACT *16-year old male presented with ectopically erupted upper left canine and Class II molar relation with skeletal class II pattern. Maxillary 1st premolars and mandibular 2nd premolars extraction was planned to correct ectopic position of canines and Class II molar relation. Segmental 0.017×0.025" TMA T loop was used to retract the canines into ideal position. Treatment results showed ectopic position of canines was corrected, bilateral Class I molar and canine relation achieved. The overall treatment took 23 months.*

INTRODUCTION

Ectopic eruption of maxillary canines is not uncommon[1]. Ectopic canines are believed to occur due to wide range of systemic and local causes. Environmental factors may contribute to this anomaly due to the long, tortuous eruption path of canine. Many treatment problems have been considered for this problem. However, treatment methods vary greatly with the severity of tooth malposition and consequent malocclusion. Two approaches have been developed for canine retraction: sliding mechanisms and loop mechanisms[2]. Many patients with ectopic maxillary canines show deficiency of space, extraction of premolars should be required in such cases. Segmented arch technique is found to be highly successful in treatment of such cases. It consists of multiple wires found in different portion of arch. The force system is relatively constant with long range of activation and optimum force level; thus the resultant movement is predictable[3]. Burstone stated that moment/force ratio; magnitude of force and force constancy determines the success of the appliance[4]. Segmented retraction of canines with frictionless mechanics reduces the strain on posterior teeth[5].

CASE PRESENTATION

16-year-old male reported with a chief complaint of irregularly placed upper front teeth. The patient showed no relevant medical history. He showed skeletal Class II jaw bases, convex profile with vertical growth pattern. He had incompetent upper and lower lips, and excessive lip strain on closure. (Fig 1) He showed ectopically erupted upper left canines and Class II molar relation on left side and end on molar relation on right side. He revealed crowding normal overjet and overbite. (Fig 2) The panoramic radiograph showed presence of 32 teeth with no evidence of bone loss. (Fig 3) The lateral cephalometric radiograph showed Wits appraisal of 5 mm and ANB angle of 6°, indicative of Class II skeletal jaw bases. The SN-mandibular plane angle of 35° was suggestive of vertical growth pattern. The patient had normally inclined maxillary and with UI-NA 4 mm/23° and proclined mandibular incisors with L1-NB 7 mm/36°. (Fig 3)

Fig 1: Pretreatment facial photographs

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Fig 2: Pretreatment intra oral photographs

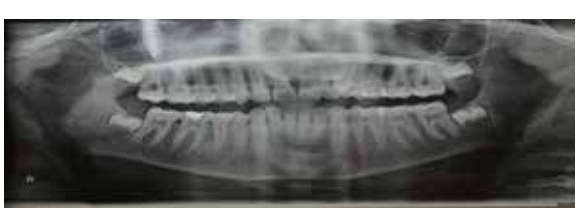

Fig 3: Pretreatment Panoramic and Lateral Cephalogram

TREATMENT OBJECTIVES

The primary objectives were to correct ectopically erupted canines with Class II molar relation. Other objectives were to achieve ideal overjet, overbite and achieve normal mandibular incisor inclination.

TREATMENT PLAN

Ectopically erupted canines and Class II molar relation was the main criteria in determining the applicable treatment plan. Extraction of maxillary first premolars and mandibular second premolar was planned to improve ectopic position of canines and to correct Class II molar relation. Thus group A anchorage was planned for maxillary arch to retract the canines and group B anchorage was planned for mandibular arch to allow mesial movement of the mandibular molars. To enhance the anchorage in maxillary arch loop mechanics was planned along with nance palatal arch in the maxilla.

TREATMENT PROGRESS

MBT appliance with 0.022×0.028″ slot was used. A nance palatal arch in the maxilla was placed on banded first molars to enhance the anchorage. Alignment and leveling of anchor teeth was done with progressive archwire change. After alignment and leveling, sectional 0.019×0.025″ stainless steel archwire placed in posterior segments and modified segmented 0.017×0.025″ TMA T loop with vertical bull loop was employed at the bracket of ectopic canine and accessory molar tube. (Fig 4) T loop was activated by 3 mm at subsequent appointments. The activation was done by pulling the distal arm and cinching it distal to the first molar. The canines started moving distally. Complete retraction of individual canine was achieved in a period of 6 months. After individual canine retraction, alignment and leveling was accomplished with progressive archwires. The archwires were cinched distal to molar to avoid maxillary and mandibular incisor proclination. Class II elastics were used to correct Class II molar relation on 0.017×0.025″ stainless steel archwires. After molar correction, arches were coordinated on 0.019×0.025″ stainless steel archwires. Then remaining extraction spaces were closed by retraction of anteriors.

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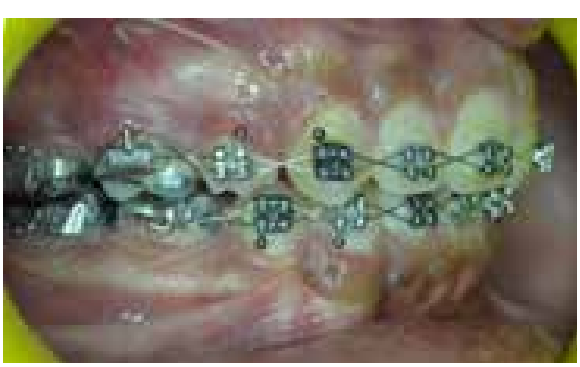
Fig 4: Segmented T-loop with vertcal bull loop (0.017 x 0.025 inch TMA)

TREATMENT RESULT

The change in the patient's smile was observed during treatment. With extraction of the upper 1st premolars and lower 2nd premolars, retraction of upper left canine and mesial movement of mandibular molars was achieved (Fig 5). The Class II molar relation was fixed into Class I relationship, ideal overjet and overbite was achieved. The vertical dimension of face was maintained during orthodontic treatment. Mid stage intraoral photographs and lateral cephalogram (Fig 6) showed that the maxillary and mandibular incisors were inclined appropriately. The panoramic radiograph (Fig 6) showed adequate root parallelism in both upper and lower arches.



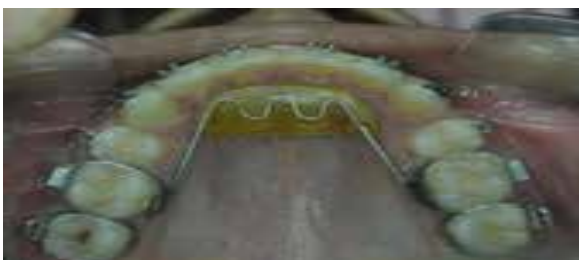


Fig 5: Intra oral photographs at nearly completion of treatment

Fig6: Panoramic and Lateral Cephalogram at nealy completion of tretament

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DISCUSSION

Repositioning an ectopic erupted tooth commonly involves a combination of surgical, periodontal and orthodontic challenges. Moreover, a variety of orthodontic technique has been well documented. The segmented T-loop applied in this case displayed some advantages. Principal benefit of this segmented arch was control of three dimensional tooth movement (vertically, anteroposteriorly, buccolingually) merely by adjusting different parts of the segment.

Ectopic eruption and impaction of canines is a commonly seen clinical problem. The incidence of impaction ranges between 1 % and 3%. The cause of canine impaction can be the result of localized factors or can be a polygenic multifactorial inheritance and associated with other dental anomalies[3]. Although the management of the ectopically erupting teeth necessitates the combined expertise of a number of clinicians, the orthodontist should have the primary responsibility of coordinating these efforts to provide the patient with the optimal treatment options with the most stable and favorable outcome.

During the commencement of retraction of the ectopic erupted canine, the segmented T-loop served as a retraction spring, which offered not only a distal traction force on the canine with active tying back, but also a moment for anti-distal tipping as well as torque control of the canine produced by bending up the mesial horizontal portion on the full size .017 x .025 T.M.A. wire. As the retraction progressed, the ectopic tooth was separated from the root of the adjacent lateral incisor and gradually moved distally toward the proper anteroposterior position while the canine still kept its axial inclination.

At the late stage of repositioning, a vertical component of force operating on the canine became more desirable. When the segmented arch was adjusted to exert an extrusive force to bring the canine toward the occlusion, the same as the mechanism of a cantilever arch, a reciprocal intrusive force on the molar was also anticipated. Previous to employing the retraction and extrusion force on the canine, the posterior teeth were aligned and stabilized with a .017 x .025 stainless steel continuous wire in addition to the nance palatal arch for anchorage reinforcement.

Unlike the continuous arch wire, in which actions and reactions may occur between adjacent teeth, segmental principles can be used to diminish the undesirable side effects produced on adjacent brackets because it is independent of other parts of the appliance[3]. An additional avantage of the spring is that is provides a relatively continuous force which is well controlled and easily modified.

CONCLUSION

It is desirable to maintain a constant force level during tooth movement, and this is achieved by designing springs with low deflection characteristics. T.M.A. has excellent spring back properties with good formability. The ectopic tooth is retracted by a segmented T-loop spring made with T.M.A. that accumulates a continuous force from being active tied back, and received an anti distal tipping moment by tip forward bend on the mesial horizontal leg of the T-loop. An additional principal benefit we appreciated is that the force system is predictable since we are basically dealing with frictionless springs and are not dependent upon sliding teeth along an arch wire for control.

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