

A Modified Cantilever for Traction of Palatally Impacted Canine

Hemang Kohli^{1*} Parul Bhatnagar²

¹Senior Lecturer, Department of Orthodontics and Dentofacial Orthopaedics, Seema Dental College and Hospital, Rishikesh, Uttarakhand, India.

²Senior Lecturer, Department of Pedodontics and Preventive Dentistry, Seema Dental College and Hospital, Rishikesh, Uttarakhand, India.

ABSTRACT

Background: A case report of young female adult with unilateral impacted canine due to retained deciduous having Angles Class I bimaxillary protrusion, treated with all first premolar extraction using MBT .022 prescription. The Aim of the paper is to present a case of treating unilateral palatally impacted canine using modified cantilever made up of .017" X 025; TMA wire. The use of cantilever for traction of impacted canines is very efficient and with predictable outcome minimizing the counter effects.

Keywords: Modified cantilever, Oral health, Orthodontics.

INTRODUCTION

Maxillary canine impactions accounts in 2% of the population with female predominance than males. In cases with canine ectopic eruption 85% are palatal impactions and labial or buccal impactions are only 15%^{1,2}. Etiological factors responsible for impaction of the canine are, the long path for full eruption, genetic factors, trauma, premature loss of deciduous canines or their prolonged retention could be associated with impacted permanent canine. Canine impactions can also be the consequence of displacement of lateral incisors or of the presence of impacted teeth or odontomas³.

Impacted and ectopically erupted maxillary canines can be difficult to treat and time consuming, depending on the position of the impacted teeth^{4,5}. Although various inter and intra-arch devices have been devised⁶. Chances of root resorption in adjacent teeth increases with improper direction or magnitude of applied or reactionary forces, proper management of the applied mechanics is essential for the success and an important step toward evidence-based treatment.

Cantilever mechanics is a choice of many orthodontists for treating impacted or ectopically erupted canines. A two-tooth system stressed by a couple of forces can be used to obtain an extrusive force to the canine and an intrusive force to the molar⁷. One couple orthodontic appliances can increase the predictability of tooth movement and reduces the need of appliance reactivation and the occurrence of possible intra-arch unwanted side effects⁸.

The orthodontic management of these difficult cases requires the use of specific orthodontic mechanics, which could allow a perfect three-dimensional control of tooth movement in order to reduce possible side effects. This is a case report of young female adult with impacted canines treated with modified cantilever fabricated on TMA 17x25 wire on MBT .022 prescription.

Received: Jan. 3, 2021; Accepted: Mar. 13, 2021

*Correspondence Dr. Hemang Kohli.

Department of Orthodontics and Dentofacial Orthopaedics, Seema Dental College and Hospital, Rishikesh, Uttarakhand, India.

Email: hemangkohli@gmail.com



Fig:1(a) pre-treatment extraoral photos (b) post-treatment extraoral photos

CASE REPORT 1

A 24-year-old female reported at clinic with complaint of missing permanent canine. On clinical examination facial symmetry was present with proportional face having convex profile, Incompetent lips [Fig:1(a)], Angle's Class I molar relation on left side & end-on relation on right side with non-coinciding midlines, anterior open bite on right side with normal overjet. Retained deciduous 63 and absent 23 [Fig:3(a)] palatally impacted canines were confirmed with IOPR, OPG, CBCT [Fig:2(a,b,c)].

The proposed treatment prioritized with traction of upper right canine with improvement of occlusion and aesthetics. Treatment started with bracket prescription MBT with slot .022, initial levelling and alignment was done using .016 Niti wire

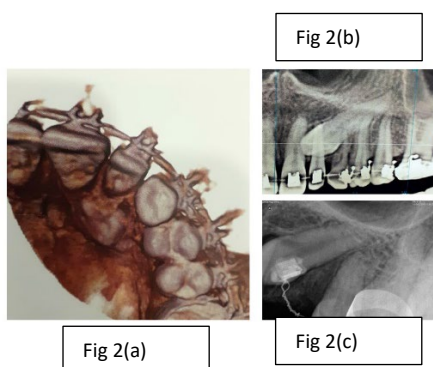


Fig: 2 radiographic interpretation (a)- 3D CBCT confirms palatal position. (b) OPG (c) RVG

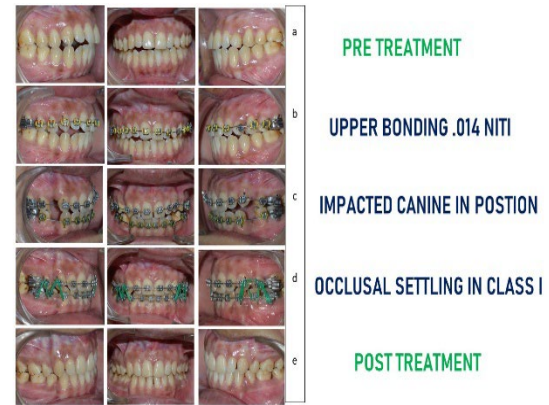


Fig 3 (a) intraoral pre-treatment (b) initial bonding .014 niti (c) dis-impaction of canine and all first premolar extraction (d) occlusal settling (e) post-treatment with anchoring complete maxillary unit with 19x25 ss wire except canine. Surgical exposure was made from palatal aspect [Fig:4(a)] confirming the canine crown position from CBCT with minimal invasion and orthodontic attachment was placed. Firstly, the closed technique was used for canine traction through Pi-Gi back .016 Niti wire that initiated the tooth movement, after couple of months when canine crown tip was evident, open technique was started with just soft tissue exposure using e-chain followed by a cantilever made of TMA wire (.017" x .025") [Fig: 5(c)] coupled by buccal to achieve mechanical benefits. Base arch wire remained .019X.025 SS with soldered stops to prevent buccal shifting of cantilever [Fig: 5(a)].

After traction, controlled with cantilever, a couple mechanics was used for canine de-rotation [Fig: 4(e)]. A round wire .016 NiTi was added to the system of forces, causing minimal side effects and helping the canine to achieve optimal position [Fig: 4(f)]

[Fig: 6(e-h)] shows the intraoral and extraoral end result of orthodontic treatment. The mechanics used was very efficient without side effects, preserving the characteristics of the patient with satisfactory standard facial profile [Fig 1 (b)]

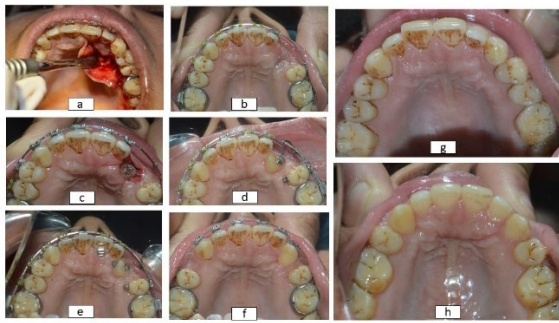


Fig 4 (a-h): confirming the canine crown position from CBCT with minimal invasion and orthodontic attachment was placed.

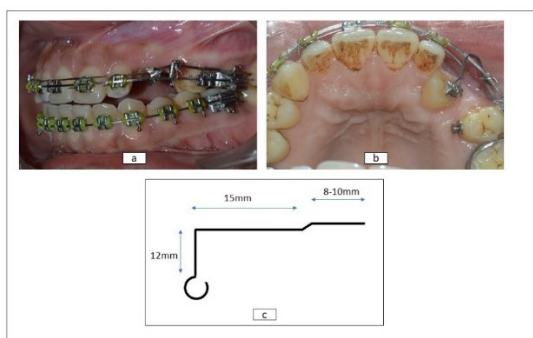


Fig 5(a-c): (a) Intra-oral Modified Cantilever .017 x .025 TMA wire, soldered stops on .019 X .025 SS wire (b) Occlusal view of cantilever (c) Modified Cantilever .017 x .025 TMA wire Design.



Fig 6 (a-h): Pre-Treatment photographs, (e-h) Post-Treatment photographs.

DISCUSSION

The maxillary canines have significant incidence of impaction, being the most affected teeth after the third molars. The impaction of the maxillary canine is more common in females with palatal & unilateral trend⁹. In this case, ectopic horizontal position of canine with retained

deciduous canine resulted in its impaction. The diagnosis was confirmed based on radiographic evaluation. No history of trauma or family report. After initial analysis of impacted tooth position having convex facial profile with bimaxillary protrusion treatment plan was to extract all four first premolars and bringing canine into occlusion.

Three-dimensional movement of canine extrusion, up-righting, buccal and rotation was done using pi-gi back wire that initiated extrusion movements, to tip and upright e-chain was used. Cantilever made up of TMA wire applied continuous extrusive force to bring out palatally positioned canine, TMA wire inserted into accessory tube slot and overlaid on 19x25 arch wire in MBT .022 brackets with soldered stops to prevent any unwanted movements.

The cantilever mechanics allowed a correct repositioning of the impacted teeth. From a clinical point of view, the use of cantilevers allowed an optimal control of the arch-forms, and determined a shorting of the treatment duration¹⁰. Hence, it could be considered an efficient approach to manage cases with single or multiple impactions.

CONCLUSION

Orthodontic and aesthetic outcomes are compromised in patients with impacted or ectopically placed maxillary canines. Proper treatment planning and efficient mechanics helps achieving the desired results within significant time duration.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interest regarding this article.

REFERENCES

1. Rayne, J.: The unerupted maxillary canine, Dent. Pract. Dent.Rec. 19:194-204, 1969.
2. Bishara, S.E: Impacted maxillary canine, Am j. orthod. 101:159-171, 1992
3. Nakandakari et al: Orthodontic Traction of Impacted Canine Using Cantilever, Case reports in dentistry. 4386464, 2016.

4. Yadav, S; Chen, J; Upadhyay, M; Jiang, F.; and Roberts, W.E.; Comparison of the force systems of 3 appliances on palatally impacted canines, *Am. J. Orthod.* 139:206-213, 2011.
5. Yadav, S; Chen, J; Upadhyay, M; Jiang, F.; and Nanda, R: Three-dimensional quantification of the force system involved in a palatally impacted canine using a cantilever spring design, *Orthodontics (Chic.)* 13:22-33, 2012.
6. Bowman, S.J. and Carano, A: The Kilroy spring for impacted teeth, *J. Clin. Orthod.* 37:683—688, 2003.
7. S. J. Lindauer and R. J. Isaacson, "One-couple orthodontic appliance systems," *Seminars in Orthodontics*, vol. 1, no. 1, pp. 12–24, 1995.
8. S. Paduano, G. Spagnuolo, G. Franzese, G. Pellegrino, R. Valletta, and I. Cioffi, "Use of cantilever mechanics for impacted teeth: case series," *The Open Dentistry Journal*, vol. 30, no. 7, pp. 186–197, 2013.
9. G. Richardson and K. A. Russell, "A review of impacted permanent maxillary cuspids: diagnosis and prevention," *Journal of the Canadian Dental Association*, vol. 66, no. 9, pp. 497–501, 2000.
10. Yadav, S.; Upadhyay, M; Uribe, F.; Nanda, R.; Mechanics for treatment of Impacted and ectopically erupted maxillary canines. *J. Clin. Orthod*, vol. XLVII (5); 305-313.