

Case study

Management of bilateral impacted maxillary canines (BIMC): open surgical exposure and orthodontic traction.

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Abstract:

Background: Patients presenting with BIMC are relatively rare and the aim of the Orthodontist is to create a dentition that is functionally and aesthetically acceptable. The BIMC may result in altered facial appearance with malocclusion and psychological distress in some individuals.

Case presentation: The present case report describes a 17-year-old female patient with non-syndromic, BIMC. Clinical and CBCT examinations revealed BIMC. Following open surgical exposure treatment planning, the patient was treated with orthodontic fixed mechanotherapy to correct BIMC and other problems. Slow force mechanics with passive self-ligating MBT 0.022 orthodontic braces were used. **Results:** Open surgical exposure and active orthodontic treatment was completed in 18 months. The management of BIMC requires multidisciplinary approach to achieve better aesthetics and improved occlusal function. **Conclusion:** A combined Open Surgical Exposure-Orthodontic Traction-Orthodontic treatment would help achieve desired aesthetics and functioning occlusion.

Keywords: Impacted Canine; Open surgical exposure.

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Introduction

Despite lot of advancement in the field of orthodontic, successful management of impacted maxillary canine still poses a challenge to the clinicians. They are usually guided to proper alignment in the dental arch treated by surgical exposure followed by orthodontic traction¹. Though there are varied opinions about the etiology of impacted canine/ectopic eruption, it is generally agreed that it is multifactorial with inadequate anterior-posterior growth of the jaws to be the major factor². It was shown by Young³ that the incidence/occurrence of ectopic eruption is significantly higher in the maxilla as compared to mandible and was more frequent in males than in females³. It has been observed that the maxillary permanent first molars followed by the maxillary permanent canines are commonly affected by ectopic eruption.

Originally, it was believed that 85% of ectopic canines were palatally displaced⁴, but according to a more recent study by Brin et al it is about 50%⁵. From these figures, it can be assumed that the impact of ectopically placed canine can affect the psychological development of the child/individual

and may in general affect the quality of life. Early diagnosis of such ectopically developing maxillary canines and instituting the corrective measures would minimize the negative impact of teeth and boost up the morale and confidence of the individual affected.

Case presentation

Diagnosis

A 17-year-old female patient was diagnosed with a skeletal class I relationship with BIMC. A dental class III incisor relationship and a Class I molar relationship was evident along with a 12 and 22 crossbite, reduced over jet and overbite. (Figures 1) Lower arch had mild crowding with buccally positioned canines (Figures 1).

After discussing possible treatment options with patient and her father, they agreed to undergo Open Surgical Exposure-Orthodontic Traction-Orthodontic treatment in an effort to restore aesthetics and function.

Treatment objectives

The treatment aims were:

- (1) to open BIMC surgically
- (2) to align BIMC in proper occlusion
- (3) to correct the class III incisor relationship

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- (1) to correct 12 and 22 crossbite
- (1) to achieve normal overjet and overbite
- (1) to establish reasonable occlusion and
- (1) to establish aesthetics.

Open surgical exposure

BIMC exposure done(Figure 1) with all aseptic precaution under buccal infiltration type local anaesthesia. All procedure [Open surgical exposure and complete orthodontic treatment] has been done by the same operator.

Orthodontic treatment

The orthodontic fixed appliance was bonded on the upper and lower teeth using the MBT passive self-ligating 0.022 inch Preadjusted Edgewise Appliance(Figure 1). The maxillary and mandibular teeth were levelled with continuous archwires, starting with 0.012-inch, 0.014-inch, 0.016-inch, 0.016×0.016-inch, 0.017×0.025super elastic nickel-titanium and progressing to a 0.017×0.025and 0.019 × 0.025-inch stainless steel wire.Slow force mechanics has been used until BIMC reached in occlusion. Box

elastic and triangular elastics were used for 2 months for achieving the normal overjet, overbite and good interdigation (Figure 1).

Cone beam computed tomography (CBCT) and intra oral photographs were taken for diagnostic evaluation. Final CBCT revealed good alignment and the successful management (Figure 2 and 3).

The duration of the active orthodontic treatment was 14 months which was followed stabilizing and finishing with bonded rigid wires. Following the removal of orthodontic appliances, essix retainers were given for both the arches. Active orthodontic treatment and orthodontic traction lasted for 18 months and the patient cooperation, excellent maintenance of oral hygiene was appreciated during the entire duration of treatment. The clinical status and the radiographic results at the end of treatment were excellent and were in line with the expected/desired outcome (Fig 2 and 3). The patient was satisfied with the results of our treatment methodology and is under regular follow up.



Figure 1. Intra oral potographs of present case. Upper row – pre-treatment photographs, 2nd row – BIMC and bonded upper fixed orthodontic appliances, 3rd row - finishing stage and bottom row – after debonding.

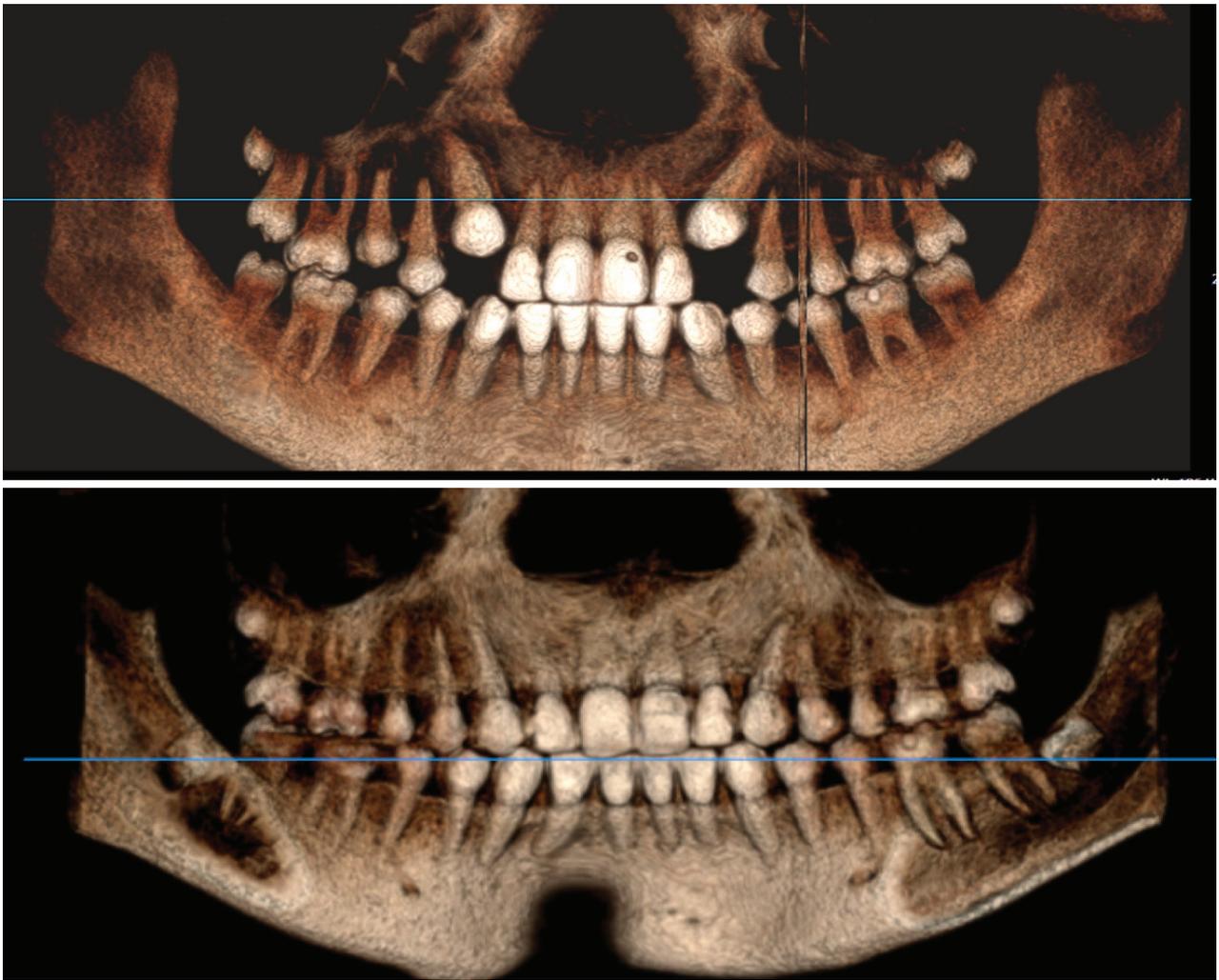


Figure 2. CBCT panoramic image, pre [upper] and post [lower] results.

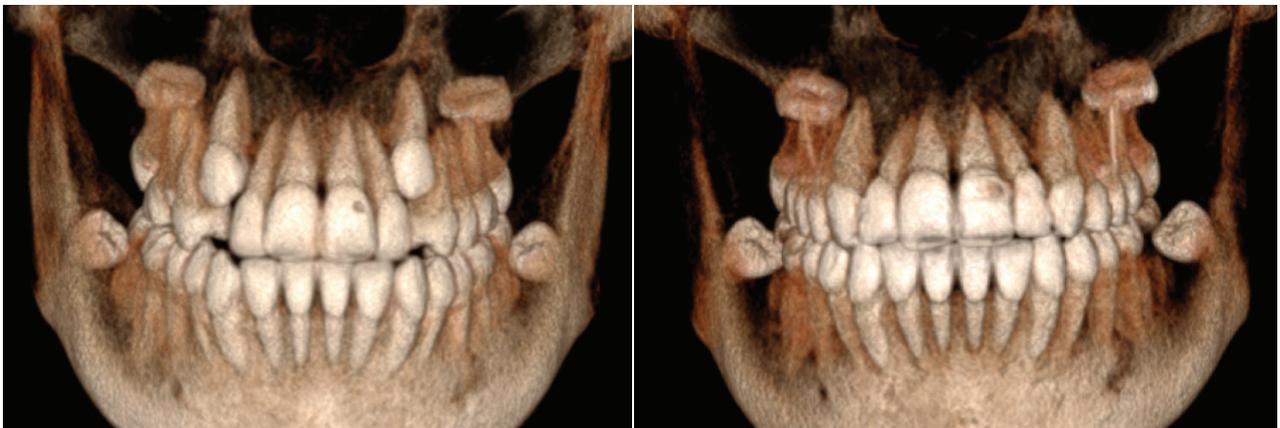


Figure 3. CBCT frontal view image, pre [right] and post [left] results.

Discussion

Orthodontic correction of malaligned teeth and disturbances associated with jaw growth and restoring their relation has been followed since its inception and it has been shown to be beneficial in accurately reproducing the function, dental health and aesthetics⁶⁻¹⁴.

Treatment of BIMC is an expensive, time-consuming process involving surgical exposure of both the canines followed by fixed braces for variable amount of time depending upon the case to align them within the dental arch¹. Two techniques have been employed routinely for their exposure namely, the closed and the open techniques. In the present case, open technique

has been undertaken to expose them by excising the overlying buccal gingiva. The orthodontic brackets can be then bonded to the exposed canines and align them within the dental arch with arch wire¹. Surgical failure and detachment failure of the orthodontic braces is least with open technique and post-surgical complications are negligible.

According to Melkos and Papadopoulos and Londhe et al.^{15,16}, while managing impacted canines, a surgeon must be judicious and decide between the closed eruption and apically positioned flap to expose and allow its orthodontic eruption. In case of labially erupted canines, exposure is preferred with the closed eruption technique as compared to that of apically positioned flap as latter technique has an aesthetic sequelae such as increased width of the attached tissue, increased length of the clinical crown, gingival scarring, damaged periodontium and intrusive relapse.

With the positive benefit of MBT passive self-ligating braces technique and slow force mechanics, this case has been successfully finished by one and half year only. As the patient and father was extremely happy with the outcome, and the fixed orthodontic appliances were removed. This case report presents Open Surgical Exposure-Orthodontic Traction-Orthodontic treatment that was applied for restoration of aesthetics, function and appearance.

Proper open surgical exposure-orthodontic traction-orthodontic treatment may result not only in the restoration of function to the BIMC but also a marked improvement in aesthetics.

Conclusion

The present case report indicates the importance of proper approach in therapeutic treatment and restoration of BIMC by Open Surgical Exposure-Orthodontic Traction-Orthodontic Treatment in achieving both long-lasting functional and aesthetic results.

Consent

Written informed consent was obtained from the patient and her father for publication of this report and any accompanying images.

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Author Contributions

Conception and design: MKA

Case management: MKA

Analysis and interpretation of the data: MKA

Drafting of the article: MKA

Critical revision of the article for important intellectual content: MKA

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References:

1. Parkin N, Benson PE, Thind B, Shah A, Khalil I, Ghafoor S. Open versus closed surgical exposure of canine teeth that are displaced in the roof of the mouth. *Cochrane Database of Systematic Reviews* 2017, Issue 8. Art. No.: CD006966. DOI: 10.1002/14651858.CD006966.pub3. <https://doi.org/10.1002/14651858.CD006966.pub3>
2. Mera O, Williams F. Ectopic eruption pattern in selected permanent teeth. *J Dent Res.* 1962;41:607-16. <https://doi.org/10.1177/00220345620410031301>
3. Young DH. Ectopic eruption of permanent first molar. *J Dent Child.* 1957;24:153-62.
4. Ericson S, Kurol J. Incisor root resorptions due to ectopic maxillary canines imaged by computerized tomography: a comparative study in extracted teeth. *Angle Orthod.* 2000;70(4):276-83.
5. Brin I, Becker A, Shalhar M. Position of maxillary permanent canine in relation to anomalous or missing lateral incisors: a population study. *Eur J Orthod* 1986;8(1):12-16. <https://doi.org/10.1093/ejo/8.1.12>
6. Alam MK, Qamruddin I, Purmal K. *Malocclusion: Causes, Complications and Treatment.* Nova Publisher. NY, USA. 2018. ISBN: 978-1-53613-123-9 eBook ISBN: 978-1-53613-124-6
7. Alam MK. Orthodontic treatment of mandibular anterior crowding. *Bangladesh J Med Sci.* 2009;8(1-2):33-36. <https://doi.org/10.3329/bjms.v8i1.3188>
8. Alam MK. Bimaxillary proclination with spacing: Treatment for Esthetic Improvement. *Bangladesh J Med Sci.* 2009;8(4):129-134. <https://doi.org/10.3329/bjms.v8i4.4710>
9. Alam MK. The multidisciplinary management of Median Diastema. *Bangladesh J Med Sci.* 2010;9(4):234-237. <https://doi.org/10.3329/bjms.v9i4.6691>
10. Alam MK. Contemporary treatment of a Class II division 1 case. *Bangladesh J Med Sci.* 2012;11(1):63-65. <https://doi.org/10.3329/bjms.v11i1.9827>
11. Alam MK. Dentofacial changes in Class II division 1. *Bangladesh J Med Sci.* 2014;13(3):350-352. <https://doi.org/10.3329/bjms.v13i3.19158>
12. Alam MK, Purmal K, Low A, Pohchi A. Interdisciplinary case of multiple congenitally missing permanent teeth. *Bangladesh J Med Sci.* 2017;16(3):467-473. <https://doi.org/10.3329/bjms.v16i3.32878>
13. Alam MK, Ayub AAM, Taib H. Interdisciplinary care of the periodontally compromised elderly patient. *Bangladesh J Med Sci.* 2018;17(1): 161-171. <https://doi.org/10.3329/bjms.v17i1.35300>
14. Alam MK, Nowrin SA, Shahid F, Haque S, Imran A, Fareen N, Sujon MK, Zaman S, Islam R, Nishi SE. Treatment of Angle class I malocclusion with severe crowding by extraction of four premolars: A case report. *Bangladesh J Med Sci.* 2018;17(4):683-687. <https://doi.org/10.3329/bjms.v17i4.38339>
15. Melkos AB, Papadopoulos MA. Periodontal aspects associated with the surgical and orthodontic treatment of impacted canines. *Hellenic Orthod Rev.* 2004;7:9-24.
16. Londhe SM, Roy ID, Kumar P. Management of Bilateral Impacted Maxillary Canines. *Med J Armed Forces India.* 2009;65(2): 190-192. [https://doi.org/10.1016/S0377-1237\(09\)80147-0](https://doi.org/10.1016/S0377-1237(09)80147-0)