



## CASE STUDY

### A NON-SURGICAL CORRECTION OF OPENBITE

\*Terence Abraham

AJ Institute of Dental Science Mangalore, India

#### ARTICLE INFO

##### Article History:

Received 29<sup>th</sup> November, 2016  
Received in revised form  
25<sup>th</sup> December, 2016  
Accepted 02<sup>nd</sup> January, 2017  
Published online 28<sup>th</sup> February, 2017

##### Key words:

Openbite,  
Tongue crib,  
Box elastics.

#### ABSTRACT

**Aim:** This case reports discuss the non-surgical correction of openbite using conventional biomechanics.

**Background:** Open bite is a malocclusion that occurs in the vertical plane, characterized by lack of vertical overlap between the maxillary and mandibular dentition. Openbite can occur in the anterior and the posterior region and are called anterior openbite and posterior openbite respectively. The diagnosis, treatment, and successful retention of treated openbite malocclusion pose a challenge to the technical ability and skills of the clinicians.

**Case Description:** This case reports discuss the management of Anterior openbite in a 32 yr old male patient who refused surgical treatment so a non-extraction treatment was planned using box elastics. Anterior spacing was closed using elastic thread. Class I molar and canine relation was achieved with normal overjet and overbite along with a pleasing smile.

**Conclusion:** The use of fixed tongue crib and Box elastics could correct the anterior openbite in some extent and helped in maintaining proper Overjet and overbite, improvement in profile and smile esthetics. Fixed retainer with tongue crib along with patient motivation for tongue exercise improved the long-term stability.

**Clinical significance:** This case report discussed the non surgical management of anterior open bite using conventional biomechanics. NiTi wire used here benefits the correction of open bite by its bite deepening property. Fixed tongue crib and Box elastics in some extent helped in maintaining proper overjet and overbite, improvement in profile and smile esthetics.

Copyright©2016, Terence Abraham. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Terence Abraham, 2017. "A non-surgical correction of openbite", *International Journal of Current Research*, 09, (02), 46821-46824.

## INTRODUCTION

The term "openbite" was coined by Caravelli in 1842 as a distinct classification of malocclusion. Prevalence in the population ranges from 1.5% to 11%. The age factor, however, affects prevalence, since sucking habits decrease and oral function matures with age. At six years old 4.2% present with AOB whereas at age 14 the prevalence decreases to 2%. (Artese *et al.*, 2011) Openbite is a malocclusion that occurs in the vertical plane, characterized by lack of vertical overlap between the maxillary and mandibular dentition. Openbites can occur in the anterior and the posterior region (Mandava and Kumar, 2009). Many potential etiologic factors are implicated as causes of open bite including heredity, unfavorable growth patterns, digit-sucking habits, tongue and orofacial muscle abnormal function, orofacial functional matrices and their interaction with the skeletal components, imbalances between jaw posture, occlusal and eruptive forces and head position. Openbites occur less frequently than deepbites. Severe

deepbite (overbite of 5 mm) is found in nearly 20% of children and 13% of adults, while openbite (negative overbite >-2 mm) occurs in less than 1%. (Mandava and Kumar, 2009) This case reports discuss the management of Anterior openbite in a 32yr old male patient who refused surgical treatment so a non-extraction treatment was planned.

#### Case description

32 yr old male patient came to dept of orthodontics (AJIDS, Mangalore) with chief complaint of spacing between teeth. On examination patient had convex profile, class I molar relation bilaterally, Anterior openbite (reverse overjet = 4.5) and proclination and spacing in upper and lower anteriors, midline diastema, secondary tongue thrusting habit and reduced nasolabial Angle (Fig.1 a,b,c). Macroglossia was noticed (Fig. 2 a,b,c,d,e). Thick fibrous band was seen in IOPA (Fig. 3). On cephalometric radiograph he had skeletal class II base with Average growth pattern and proclined upper and lower anteriors, normal LAFH and inclination angle of maxilla suggesting dental Anterior openbite (Fig. 4 a,b). Patient diagnosed as

skeletal class II with Average growth pattern underlying angles class I malocclusion with anterior openbite (Table 1).

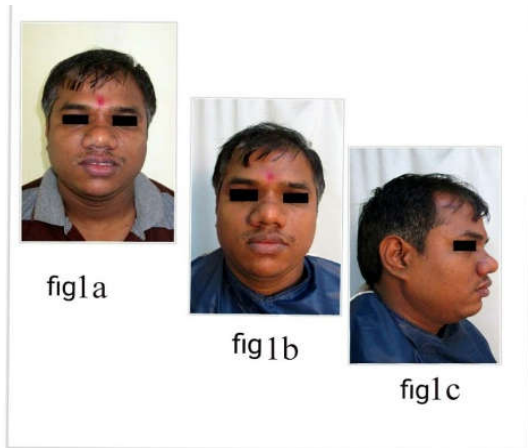


Fig.1 a,b,c. Pre-treatment photographs

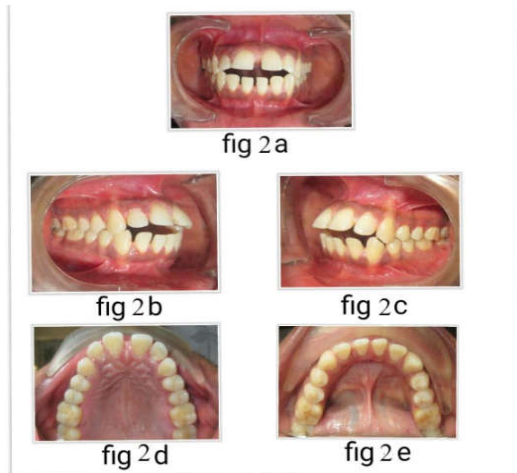


Fig . 2 a,b,c,d,e. Pre treatment intraoral photographs



Fig. 3. IOPA showing thick fibrous band

Treatment options were surgical by Lefort's I osteotomy with maxillary impaction and fixed orthodontic Appliance using box elastics and NITI arch wires. Since patient was not willing for surgery and extraction, fixed orthodontic appliance with box elastics was planned without extraction. Treatment objectives were Correction of tongue thrusting habit, Correction of anterior openbite, midline diastema and spacing in upper and lower arch and achieving a pleasing soft tissue profile (Fig.5).

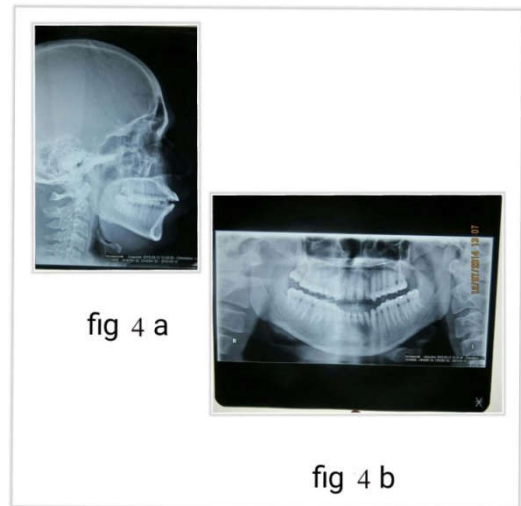


Fig. 4 a, b. Pre treatment OPG and lateral cephalogram

Table 1. Pre- and post – cephalometric values

Cephalometric Parameters	Pre treatment	Post treatment
SNA	85°	85°
SNB	80°	80°
ANB	5°	5°
WITS APPRAISAL	0	0
FH-MP	29°	27°
LAFH	73mm	72mm
UI-NA	31°	21°
LI-NB	40°	26°
IMPA	103°	91°
S LINE – UPPER LIP	4mm	4mm
S LINE – LOWER LIP	5mm	3mm



Fig. 5. Palatal Tongue Crib

Fixed orthodontic appliance (.022 \* .028 slot MBT bracket) was bonded and .016 HANT arch wire ligated on both archs, lacebacks and bendbacks given. Fixed tongue crib was given at the starting till the closure of spacing. Once the arch levelled, .016AAW placed and box elastics (2-3oz force) was given and ask patient to change daily (Fig.6 a,b,c,d,e)

Archwire progressed as. 016HANT, 016AAW, 016\*.022 NiTi, 017\*.025SS, .019\*.025HANT, 019\*.025SS. Anterior spacing was closed using e-thread and retraction was carried by active tie backs followed by bite settling with triangular elastics (red elastics). CSF and gingivoplasty was done between upper anteriors after diastema closure (Fig 7 a,b,c,d,e,f,g,h).

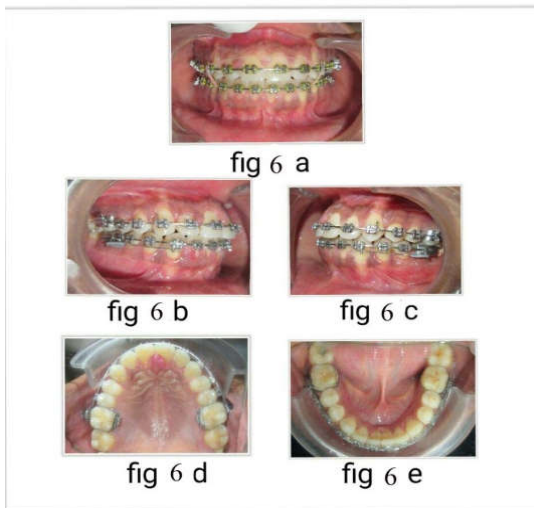


Fig. 6 a,b,c,d,e. After 6 months of treatment photographs showing Box Elastics

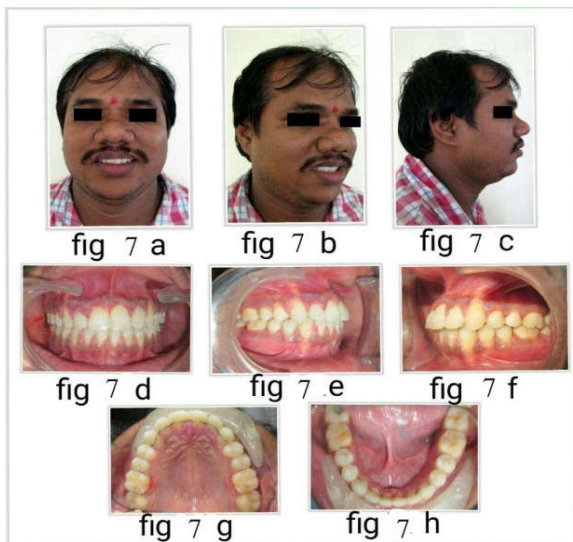


Fig.7a,b,c,d,e,f,g,h - Post-treatment photographs

After 12 months of treatment, appliance were removed (Fig.8 a,b). Post treatment records showed anterior openbite was corrected. Anterior spacing was closed in both upper and lower arch. Proper over jet and over bite achieved. Fixed retainer was given in both upper and lower arch along with removable tongue crib in upper arch. Instructions about tongue exercises were given to patient.

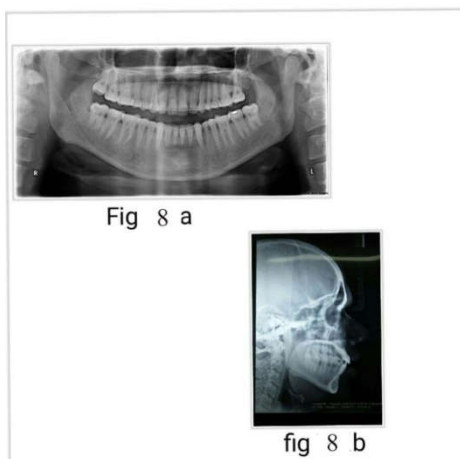


Fig.8 a,b. Post treatment OPG and lateral cephalograms

## DISCUSSION

This case report discussed the non surgical management of anterior open bite using conventional biomechanics. NiTi wire used here benefits the correction of open bite by its bite deepening property. The study done by Anthony<sup>3</sup> showed the NiTi wire is flexible enough to allow extrusion in the lower bicuspid area while preserving torque control. Significant vertical correction can be obtained by combining the NiTi wire with the stiffer stainless steel wire and vertical elastics. The morphological indications of open bite include a steep mandibular plane and increased anterior facial height, both of which reflect mainly downward and backward rotation of the mandible and vertical overgrowth of the maxilla. In most adult openbite cases that show neither severe skeletal problems nor remarkable facial disharmony, nonsurgical treatment usually has been indicated. (Hamamcia and Semra, 2006) This patient showed normal mandibular plane and facial height suggested dental anterior openbite. The effect of airway obstruction on the occlusion was demonstrated by Harvold *et al.* (1973) who, after placing acrylic blocks in the posterior region of the palate of rhesus monkeys, found that AOB had developed. Induced nasal obstruction was also performed using nasal splints in rhesus monkeys, which, in an attempt to secure an oral air passage, developed open mouth posture and protruded tongue. Greenlee (2011) in his study discussed various treatment modalities are (a) Changes in behaviour to eliminate habits or abnormal functions, (b) Orthodontic movement by extruding the anterior teeth or intruding the molars, or (c) Surgical treatment of the basal bones. The use of spurs was described by Rogers in 1927 in the treatment of three AOB cases. The spurs were welded to a palatal arch and placed from canine to canine. Subtelny (1965) and Haryett (1967) also suggested palatal crib and spurs. According to Miller (1969) myofunctional therapy is used to alter function and consists of a set of exercises to re-educate orofacial muscles in swallowing, speech and resting posture. Huang *et al.* (1990) evaluated AOB treatment stability using cribs or spurs in 33 patients divided into two groups, one with and one without growth. These authors found that AOB correction occurred in both groups but 17.4% of cases showed relapse. Denison *et al.* (1989) assessed the stability of AOB surgical treatment in 66 adult patients followed up for at least 1 year after surgery. These patients were stratified according to preoperative vertical overlap, namely: Open bite, open bite with overlap, and normal overlap. Openbite recurred in 42.9% of cases in the openbite group while the groups with openbite and overlap, and normal overlap showed no changes in postoperative overbite. It was found that the instability found in patients in the openbite group was due to dentoalveolar changes and not to skeletal changes. However, the outcomes of the stability studies described above indicate that AOB relapse is linked to two factors: Dentoalveolar changes and openbites with no vertical overlap prior to treatment.

## Conclusion

This case report discussed the non surgical management of Anterior openbite using conventional biomechanics. It concluded that the use of fixed tongue crib and Box elastics could correct the anterior openbite in some extent

and helped in maintaining proper Overjet and overbite, improvement in profile and smile esthetics. Fixed retainer with tongue Crib along with patient motivation for tongue exercise improved the long-term stability.

### Clinical significance

This case report discussed the non surgical management of anterior openbite using conventional biomechanics. NiTi wire used here benefits the correction of openbite by its bite deepening property. Fixed tongue crib and Box elastics in some extent helped in maintaining proper overjet and overbite, improvement in profile and smile esthetics. Fixed retainer with tongue crib along with patient motivation for tongue exercise improved the long-term stability.

### Acknowledgment

I would like to thank my parents who fulfilled my all wishes and my wife Dr. Femy Terence who supported me in this effort. A special thanks to my staffs in AJIDS, Mangalore for their expert guidance.

### REFERENCES

- Artese A, Drummond S, Mendes J, Artese F. 2011. Criteria for diagnosing and treating anterior open bite with stability, *Dental Press J Orthod.*, 5;16(3):136-61
- Denison T, Kokich V, Shapiro P. 1989. Stability of maxillary surgery in openbite versus nonopenbite malocclusions. *Angle Orthod.*, 59(1):5-10
- Greenlee M, Huang G, Chen S, Chen J, Koepsell T, Hujuel P. 2011. Stability of treatment for anterior open-bite malocclusion: a meta-analysis. *Am J Orthod Dentofacial Orthop.*, 2;139(2):154-69.
- Hamamcia N. and Semra S. 2006. Nonsurgical Correction of an Adult Skeletal Class III and Open-bite Malocclusion, *Angle Orthod.*, 76:527-532
- Harvold P, Vagervik K, Chierici G. 1973. Primate experiments on oral sensation and dental malocclusion *Am J Orthod.*, 5;63(5):494-508
- Haryett R, Hansen F, Davidson P, Sandilands M. 1967. Chronic thumb-sucking: the psychologic effects and the relative effectiveness of various methods of treatment. *Am J Orthod.*, 8;53(8):569-85
- Huang G, Justus R, Kennedy D, Kokich V. 1990. Stability of anterior openbite treated with crib therapy. *Angle Orthod.*, 6;10(1):17-24.
- Mandava, P. and Kumar A. 2009. Management of open bite, *J. of Essence of Dentistry*, 9, Vol. - I Issue 2.
- Miller H. 1969. The early treatment of anterior open bite. *Int J Orthod.*, 3;7(1):5-14.
- Rogers A. 1927. Open bite cases involving tongue habits. *Int J Orthod.*, 13:837-44.
- Subtelny J. 1965. Examination of current philosophies associated with swallowing behavior. *Am J Orthod.*, 3;51(3):161-82.

\*\*\*\*\*