

**Case Report****COMBINED SURGICAL AND ORTHODONTIC APPROACH IN THE MANAGEMENT OF OPEN BITE MALOCCLUSION: A CASE REPORT****Moina Adeni K\*, Umamaheswari R., Devaki Vijayalakshmi and Arul Pradeep**

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Received in revised form 7<sup>th</sup>  
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Published online 28<sup>th</sup> July, 2018**ABSTRACT**

Open bite is an anomaly in vertical dimension which occurs due to complex etiological factors and poses aesthetic and functional consequences. Once the malocclusion has been addressed we tend to ignore the deficit of lower third of face which can be managed cosmetically by genioplasty than opting for entire jaw repositioning. The present case report describes the use of palatal crib to intercept tongue thrusting habit in a growing patient with conventional orthodontics and genioplasty which serves as a valuable adjunct in orthodontic treatment. At the end of the treatment, patient had class I molar and canine occlusion with normal overbite, overjet and improved facial esthetics.

**Key Words:**Open bite, Cosmetic correction, Functional  
Genioplasty

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**INTRODUCTION**

Patients with open bite face psychological and functional problems due to reduced confidence during speech and smile and lack of canine guidance contributing to cuspal wear and temporomandibular joint disorder. Eventually, they seek orthodontic treatment for esthetics and function. Once the orthodontic treatment is completed, the patient may still present with an esthetically compromised appearance. The jaw and face related skeletal disharmonies cannot be treated by orthodontics alone. For example, a chin deficiency can be treated by a simple procedure such as genioplasty which is a much feasible esthetic alternative to repositioning of the entire jaw. This case report highlights how orthodontics in conjunction with genioplasty has addressed both functional and esthetic requirements in a 15 year old patient with skeletal class II malocclusion and anterior open bite.

**Case Report****Diagnosis and Etiology**

A 15 year old male patient reported to the Department of Orthodontics and Dentofacial Orthopedics with the chief complaint of forwardly placed upper and lower front teeth and gap between his front teeth. The patient had a positive history of tongue thrusting habit. He was in good general health, with no history of serious illnesses or trauma. Extra oral

examination revealed a leptoprosopic facial pattern, convex profile, an average nasolabial angle, lip incompetence, reverse smile arc, high clinical FMA and retrusive chin. Intra oral examination revealed ovoid maxillary arch and square shaped mandibular arch with mild lower anterior anterior crowding. (Fig.1)

**Figure1** Pre treatment records

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Patient exhibited class I molar relationship, upper and lower proclination with over jet of 6mm and open bite of 4 mm that extended upto canine region and missing 47. From a functional standpoint, he exhibited mixed breathing, predominantly oral, simple tongue thrust and adapted swallowing and speech. Cephalometric evaluation revealed skeletal class II with orthognathic maxilla and retrognathic mandible on a high mandibular plane angle and a retrusive chin. Model analysis revealed arch length-tooth material discrepancy. Based on the investigations, the case was diagnosed as Angles dentoalveolar class I malocclusion on a class II skeletal base attributing to orthognathic maxilla and retrognathic mandible on a high mandibular plane angle with anterior open bite, proclined upper and lower anteriors, mild lower anterior crowding and increased overjet and tongue thrusting habit.

**Treatment Objective**

1. To improve facial esthetics and soft tissue profile
2. To eliminate tongue thrust habit
3. To close the anterior open bite
4. To correct the proclined upper and lower anteriors
5. To maintain class I molar relationship and achieve Class I canine relationship
6. To achieve ideal overjet and interincisal angle

**Treatment Plan**

The child was counseled regarding the deleterious effect of tongue thrusting habit on facial esthetics and dentition. Considering the patient's chief complaint, it was decided to treat this case with an intercepting habit breaking appliance (fixed tongue crib) and extraction of all the second premolars with moderate anchorage and utilize this space for retraction of proclined anteriors. Additionally, advancement genioplasty was done to achieve ideal profile.

**Treatment Progress**

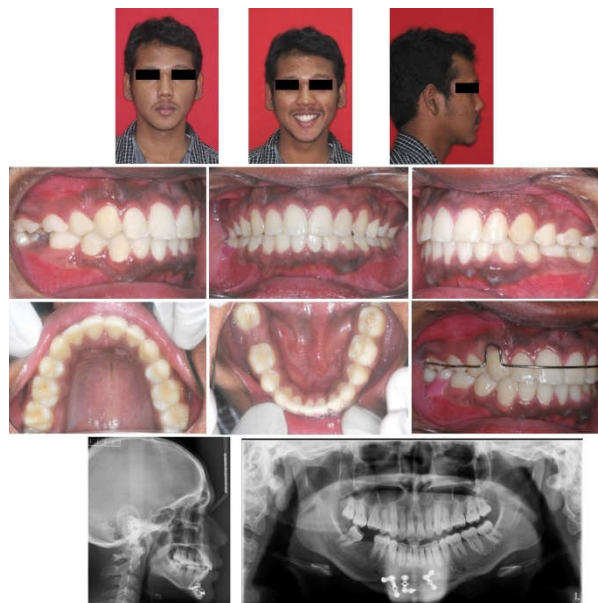
Following separator placement, banding of 16,26,36,46 was done with a soldered fixed palatal crib. The maxillary and mandibular second premolars were then extracted. The treatment was initiated with pre adjusted edgewise (0.022 x 0.028-inch slot). Alignment was performed using the following wire sequence: 0.016” NiTi, 16 x 22 NiTi, 17 x 25 NiTi, 19 X 25 NiTi and space closure by tear drop loop mechanics on 17 x 25 SS with moderate anchorage.(Fig.2)



**Figure 2** During treatment records showing strap up (A to E), retraction (F-G) and settling phase (H-J)

The patient was then subjected for 5mm augmentation genioplasty. Settling was done using intermaxillary elastics on 0.018 SS for better intercuspation. The retention phase was maintained by a wraparound retainer which was placed in the maxillary arch and a bonded lingual retainer in the mandibular arch.

At the end of the corrective treatment, it was possible to observe tremendous improvement in facial profile, good lip posture and smile. The resulting occlusion was found to be stable with Class I molar and canine relationships, adequate overbite and overjet, good form of dental arches, coincident midlines and maintenance of space for prosthetic replacement in 47. Over all treatment duration was 22 months. (Fig.3)



**Figure 3** Post treatment records

**DISCUSSION**

Open bite is a deviation in the vertical relationship of the maxillary and mandibular dental arches which is characterized by a lack of contact between opposing teeth. The etiological factors that are associated in open bite are vertical growth deficiencies, thumb or finger sucking habits and aberrant muscle functions (Subtelny and Sakuda, 1964 and Nashashibi IA 1987).[1,2] Its complexity is attributed to environmental factors that include variations in dental eruption, alveolar growth and pattern of growth of the mandible(Nielsen et al,1991).[3] They respond readily to myofunctional treatment and mechanotherapy.

Genioplasty is a patient compliant cosmetic procedure that can be done prior/after the completion of orthodontic treatment for the patient who has fairly good occlusion but still has deficient mandible especially in long face patients (Precious et al 1985 and Proffit 1981). [4,5]

This case report demonstrated the efficiency of a palatal crib in discouraging the tongue thrust habit. The anterior open bite correction was successfully done within 5 months and the entire treatment was completed within 19 months. Also, reduction in incisor inclination was seen due to interception of habit and lip pressure. Cephalometric evaluation revealed considerable decrease in mandibular plane angle by 2° which in turn reduced the lower anterior facial height. This is due to the

‘wedge effect’ produced due to 2nd premolar extraction. Functional genioplasty was performed to address the apparent profile deficit of the lower third of the face. Besides its better to opt for early surgical correction before age of 15 years. The beneficial changes includes lip competency, chin contour and fullness, good bone remodeling above the repositioned chin segment and increase in symphyseal bone thickness. This is clearly appreciated radiographically in younger individuals (Sylvain Chamberland *et al* 2015).[6] Hence a simple surgical approach can add esthetic value to the treatment. At the end of orthodontic treatment, the occlusion was stable with class I molar and canine relationship with adequate overjet and overbite. The pre and post treatment cephalometric values and superimpositions showed a dramatic skeletal and dental improvement [Fig.4,Table 1].

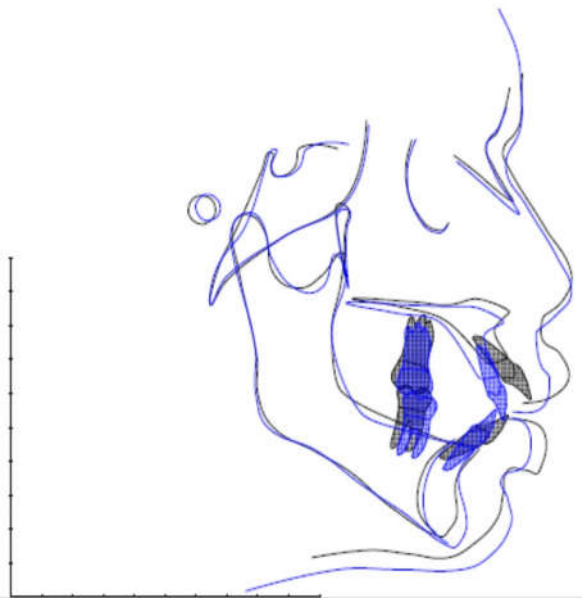


Figure 4 Superimposition of pre and post treatment lateral cephalogram

**Table 1** Comparison of pre- and post- treatment cephalometric variables

Variables	Norms	Pre treatment	Post treatment
Sagittal skeletal relationship			
Sna	82	83	84
Snb	80	79	82
Snd	76	76	79
Anb	2	4	2
N perpendicular to pog	0 to -4mm	-8	0
Dental base relationship			
U 1 to na (mm)	4	10	4
U 1 to na (°)	22	42	25
L 1 to b (mm)	4	14	9
L 1 to b (°)	25	45	32
Impa (°)	90	113	94
Inter incisal angle (°)	131	101	124
Vertical skeletal relationship			
Fma	25	31	29
Gonial angle	130 ± 7°	140°	136°
Ramus height(ar-go)	44±5mm	41	42
Body length(go-me)	71±5mm	64	70
Effective maxillary length (co- point a)	89.2±5.2mm	82	86
Effective mandibular length (co-gn)	114.9±7.1mm	109	114
Go-pg	68.5-80.1	66	76
B-pg	7.2-10.6	3	8
Lower anterior facial height (ans-gn)	66.2±5.1	70	68

## CONCLUSION

Esthetics and function is of paramount importance in orthodontics. It is essential to identify harmful oral habits and factors that can interfere with the treatment mechanics in order to achieve stable therapeutic outcome. The case presented a therapeutic protocol which gives good results in terms of interception of habit and orthodontics in conjunction with genioplasty which ultimately improves the dentofacial esthetics.

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