

Angle's Class I Bimaxillary Dentoalveolar Protrusion With Anterior Open Bite Treated With Non-Extraction Therapy.

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ABSTRACT : In orthodontic treatment, anterior open bite malocclusion is a challenging issue. This problem arises because the mandibular and maxillary dentitions have distinct occlusal planes. The open bite is distinguished by the anterior divergence of maxillary and mandibular occlusal planes, unlike seen to the overbite seen in normal occlusion. The present clinical case report describes the orthodontic treatment of an Angle's Class I malocclusion with anterior open bite and bimaxillary dentoalveolar protrusion in a 24 year old male patient. There is an overall improvement in the patient's occlusion after the treatment.

Keywords: Open bite, Orthodontic treatment, Bimaxillary dentoalveolar protrusion.

INTRODUCTION

One of the most difficult malocclusions to correct is open bite, which is related to skeletal, dental, functional, and habitual factors. There are two types of open bite: skeletal open bite and dental open bite¹. An open bite is defined by the lack of vertical overlap between opposing teeth when the remaining teeth are in maximum intercuspation. An open bite may manifest in the anterior or posterior dentition². Anterior open bite is typically caused by a complex interplay of skeletal, dental, and functional factors. Potential causes have been listed as unfavourable growth patterns, digit-sucking habits, enlarged lymphatic tissue, heredity and oral functional matrices³.

Incisor protrusion and overeruption of posterior teeth are the most typical features of an anterior open bite, but other characteristics can include a retrusive mandible, a Class II tendency, divergent cephalometric planes, a steep anterior cranial base, a short mandibular body and ramus, excessive lower anterior facial height, reduced lower posterior facial height and upper anterior facial height^{4,5}.

According to a 1973 survey of 7,400 American children aged 6 to 11, anterior open bites were more common in 16% of African Americans and 4% of Caucasians⁶. The prevalence of anterior open bite is estimated to be 14.26% in the mixed

dentition and 18.84% in the primary dentition by recent publications^{7,8}.

This article presents a case report of a 24 year old male patient, who had open bite malocclusion and was treated with non-extraction therapy.

CASE REPORT

A 24-year-old male patient reported to the department of Orthodontics with chief complaint of forwardly placed teeth in the upper and lower front region of the jaw. The patient expressed a preference for orthodontic treatment for aesthetic reasons. Additionally, there was no familial component contributing to the patient's malocclusion, as neither the patient's parents nor siblings displayed similar tendency.

The clinical examination revealed an acute nasolabial angle, average mento-labial sulcus, mesoprosopic facial form, mesocephalic head shape with a mildly convex facial profile and potentially competent lip, average clinical Frankfort Mandibular plane angle (FMA), and a normal chin. There was no gingival display while smiling. The facial midline was coincident with the upper and lower midline. There was no gross facial asymmetry detected (Figure 1). The patient had a tongue thrusting habit.

The intraoral examination showed class I canine and molar relationship on both sides. Patient is diagnosed with an anterior dental open bite of 1

mm, as well as proclination and spacing in the upper and lower front regions of the jaw (Figure 2).

Cephalometric evaluation revealed a class I jaw base (ANB: 3.0) and an average growth pattern (SN-GoGn: 30°). The incisors were proclined in both upper and lower jaw with interincisal angle (97°) and nasolabial angle (90°). All teeth were seen with root closure on the panoramic radiograph (Figure 3).

The patient was diagnosed to have angle's class 1 malocclusion, an anterior open bite, a tongue-thrusting habit, bimaxillary proclination, spaced upper and lower anteriors with an average growth pattern.

Treatment objectives were:

1. To correct the anterior open bite
2. To achieve normal incisor axial inclination
3. To maintain Class I molar, canine and incisor relation
4. To attain optimal alignment of the upper and lower teeth
5. To achieve ideal overjet and overbite.

Treatment plan

Based on the clinical examination and cephalometric evaluation showing anterior open bite malocclusion, proclined and spaced upper and lower anterior teeth, non-extraction therapy was planned for the patient. In order to correct the tongue thrusting habit, tongue training exercise was advised to the patient. The patient was advised to perform 4'S tongue exercise by spotting, squeezing, salivating and swallowing. It should be done in sets of 10, four times a day⁹.

Treatment progress

In the maxillary and mandibular arches, a straight-wire orthodontic fixed appliance with the McLaughlin, Bennett, Trevisi (MBT) prescription was bonded using a slot size of 0.022*0.028 inches (Figure 4). The initial levelling and alignment was done with 0.016-inch Nickel Titanium (NiTi) wires, followed by 0.017*0.025 NiTi, 0.017*0.025 SS, and finally, 0.019*0.025-inch stainless steel wires. After initial levelling and alignment, space closure was started with closed power chains in the upper and lower arch.

Brackets were placed 0.5 mm gingivally on the tooth surface and bite closure was accomplished.

The appliances were removed once the bite closure and finishing were complete and the treatment goals had been achieved (Figures 5 and 6). A fixed lingual bonded retainer and a removable Essix retainer were placed in the upper and lower arches after complete de-banding and debonding (Figure 7). The patient was asked to wear the retainers 24 hours per day for six months, with the exception of eating and brushing, and then only at nighttime afterward.

Treatment results

The intraoral photographs showed satisfactory dental alignment, Class I canine and molar relationships, ideal overjet and overbite, and coincident midlines. The radiographic examination demonstrated satisfactory root parallelism (Figure 8).



Fig 1: Pre-treatment Extraoral photographs.



Fig 2: Pre-treatment intraoral photographs.

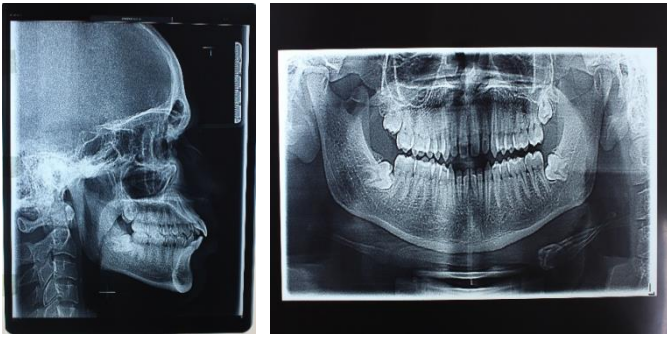


Fig 3: Pre-treatment radiographs.



Figure 6: Post-treatment Intraoral photographs.



Figure 4: Bonding done in upper and lower arch

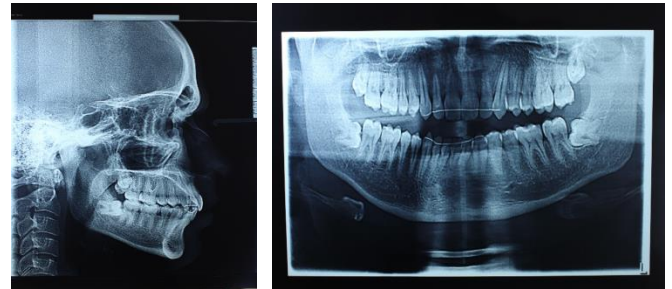


Fig 7: Post-treatment radiographs.

Table 1: Pre-treatment and post-treatment cephalometric values

Parameter	Pre-treatment	Post-treatment
Upper incisor NA(angular)	32°	19°
Upper incisor NA(linear)	8 mm	3 mm
Lower incisor NB(angular)	40°	28°
Lower incisor NB(linear)	10 mm	7 mm
Interincisal angle	97°	128°
IMPA	115°	97°
Nasolabial angle	90°	110°



Figure 5: Post-treatment Extraoral photographs



Figure 7: Essix retainer in upper and lower arch.

Discussion

The skeletal and dentoalveolar features that contribute to malocclusion occur in the majority of patients with anterior open bite. Differentiating between skeletal and dental open-bite malocclusions is a practical issue since each condition should be treated differently in order to get a stable and successful outcome¹⁰.

In order to control anterior facial height in patients with skeletal open bite, orthodontic treatment usually involves intruding the posterior teeth or halting their further eruption¹¹. Overbite and overjet can be corrected with orthodontic adjustments alone because the teeth and alveolar process both have a major impact on the dentition's vertical position as they adjust to the relationship of the jaws¹².

In order to correct an open bite, a combination of myofunctional appliances and fixed orthodontic therapy is frequently used to achieve a stable results. In order to determine whether an open bite is skeletal or dental, the vertical dimension of the skeletal morphology must be measured properly during diagnosis. For individuals with open bite malocclusion, effective treatment planning, diagnosis, and retention are essential to obtaining the most stable and favourable results¹³.

This case report showed that the patient had an anterior open bite along with proclination in upper and lower front region of jaw. The proclination of both upper and lower teeth was reduced after treatment, along with ideal overbite. In order to prevent relapse following active therapy, it is crucial to instruct the patient to use the retainer on a regular basis. Relapse is possible, even if the patient use their retainers consistently. Therefore, to avoid relapse, routine follow-up to the orthodontic clinic is essential.

Conclusion

Open bite has a multifactorial etiology. A proper treatment plan is required for malocclusion with anterior open bite correction in order to get the desired result. The outcome of any treatment should aimed at achieving aesthetically pleasing profile and functionally stable occlusion.

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Conflict of Interest

None.

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