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Class III malocclusion with anterior open bite, orthodontic treatment in an adult patient: Case report

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Abstract

Background: Patients with anterior open bite appear both dentoalveolar component and with increased skeletal vertical dimension.

Objectives: The main objective was to treat open bite with an ideal overbite and overjet relationships and to maintain proper intercuspation with midline correction.

Results: The goal of the treatment has been achieved according to patients' desire and satisfactory interdigitation. In further follow up no relapse has been seen.

Conclusion: The treatment resulted in an aesthetic, functional, and stable occlusion, along with an improved facial profile.

Keywords: Open bite, orthodontic treatment, adult patient

Introduction

Open bite is an anomaly with distinct characteristics which, in addition to involving complex, multiple etiologic factors, entails aesthetic and functional consequences^[1]. There are many reasons for the occurrence of open bite, including skeletal abnormal growth pattern; dental, respiratory, neurologic, and habitual factors; and tongue posture and function^[3]. The prevalence varies between different populations 16% in black people and 4% in white people^[7]. Types include anterior open bite, posterior open bite, dental open bite, skeletal open bite. Anterior open bite is one of the most difficult problems to treat in orthodontics^[3]. The side effects include: Aesthetics, Speech, Eating, Tooth wear. various approaches employed to treat open bite: palatal crib, orthopedic forces, extrusion of anterior teeth, MEAW technique, bite blocks to inhibit molar eruption, high-pull headgear, camouflage with or without extractions, miniimplants or mini-plates, and orthognathic surgery^[1,3]. This report presents the treatment and long-term stability of an adult case of a severe anterior open bite treated by means of non - extraction treatment

Diagnosis and Etiology

A 23-year-old female with no relevant medical history, presented with the chief complaint of forwardly placed upper front teeth. On clinical examination she had a convex profile, incompetent lips with Class I molar relation on skeletal class II jaw bases with a severe anterior open bite and spacing in the upper and lower anterior region(fig:1.a). Overjet and overbite were 10mm and - 4 mm, respectively, and both canine and molar keys showed class I relation (fig: 1.b). The cephalometric analysis (fig: 1.c) showed that the patient had a divergent facial pattern with a moderate skeletal Class II relationship with ANB angle of 7 degree. Prognathic maxilla, orthognathic mandible with proclined upper and lower anteriors (table1). OPG shows that all permanent teeth erupted.

Treatment Objectives

- To achieve a proper lip competency,
- Proper anterior overbite and overjet relationship and
- Class I canine and molar,
- Aesthetically pleasing profile and functionally stable occlusion.

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Treatment Plan

- Extraction plan: Non extraction treatment plan
- Appliances: PEA Mechanotherapy with MBT 0.022 slot prescription
- Special anchorage: Transpalatal arch
- Proposed retention: Essix clear retainers in upper and lower arch



Fig 1a: Pre-treatment extraoral and intraoral photographs



Fig 1.b: Pre-treatment patient model



Fig 1c: Pre-treatment radiograph

Cephalometric Analysis

Table 1: Pre-treatment cephalometric analysis

Variable	Pretreatment	Normal
SNA	86°	82° ± 3
SNB	79°	80°±3
ANB	7°	3°± 1
Wits appraisal	AO ahead of BO by 10mm.	0 mm
N ⊥ Pt A	9 mm	0±2 mm
N ⊥ Pog	2MM mm	0 to -4mm
Angle of inclination	80	85°
Go-Gn to SN	32°	32°
Eff. Max. Length	87mm	93.6±3.2
Eff. Mand. Length	104	121.6±4.5
Y- Axis	70°	66°
Facial axis	0°	0°
Upper incisor – NA	8 mm	4mm
Upper incisor – NA	30 °	22°
Upper incisor – SN	118°	102°± 2
Upper incisor to maxillary plane angle	53°	70°± 5
Lower incisor to mandibular plane angle	°	90°± 3
Lower incisor to NB	3mm	4mm
Lower incisor to NB	19°	25°
Interincisal angle	122°	133°± 10
Maxillary mandibular planes angle	17°	27°± 5
Lower anterior face height	59 mm	67.2 ± 4.7 mm
Face height ratio	69 %	62-65%
Lower incisor to APO line	3 mm	1-2 mm

Treatment Progress

PEA appliance included 0.022x0.028 inch MBT prescription. The arch wire sequence used were as follows: 0.016 inch NiTi, followed by 0.016 SS, 0.017x0.025 inch NiTi, box

elastics were given engaging from upper left to right canine to lower left to lower right canine, followed by 0.017x0.025 SS, 0.019x 0.025 SS wires were placed and post retraction settling elastics placed (fig 2).



Fig 2: Mid treatment intraoral photographs

Treatment Results

An ideal overjet and overbite of 2 mm was achieved with adequate intercuspation, with angles Class I molar relationship on right and left side, Class I canine relationship, Class I incisor relationship, normal lateral and protrusive excursions was achieved (fig 3.b). Facial appearance and

profile improved as a result of dental and skeletal changes (fig 3.a). Orthodontic treatment was done to correct crowding of upper and lower anteriors. PEA mechanotherapy was used with sequential stripping, to correct crowding. A satisfactory result and a good interception have been achieved.





Fig 3a: Post-treatment extraoral and intraoral photographs



Fig 3: 3b Post-treatment patient model



Fig 3: 3.c Post-treatment Radiograph

Cephalometric Analysis

Table 2: post-treatment cephalometric analysis

Variable	Posttreatment	Normal
SNA	86°	82° ± 3
SNB	80°	80°±3
ANB	6°	3°± 1
Wits appraisal	AO AHEAD OF BO by 2mm.	0 mm
N ⊥ Pt A	5 mm	0±2 mm
N ⊥ Pog	-4 mm	0 to -4mm
Angle of inclination	84°	85°
Go-Gn to SN	30°	32°
Eff. Max. Length	87mm	93.6±3.2
Eff. Mand. Length	104mm	121.6±4.5
Y- Axis	68°	66°
Facial axis	-2°	0°
Upper incisor – NA	4mm	4mm

Upper incisor – NA	16°	22°
Upper incisor – SN	100°	102°± 2
Upper incisor to maxillary plane angle	74°	70°± 5
Lower incisor to mandibular plane angle	92°	90°± 3
Lower incisor to NB	4mm	4mm
Lower incisor to NB	29°	25°
Interincisal angle	129°	133°± 10
Maxillary mandibular planes angle	27°	27°± 5
Lower anterior face height	59 mm	67.2 ± 4.7 mm
Face height ratio	66.6 %	62-65%
Lower incisor to APO line	-3 mm	1-2 mm

Table 3: 3 c comparison of pre and post treatment cephalometric analysis

Variable	Pretreatment	Posttreatment	Difference
SNA	86°	86°	0°
SNB	79°	80°	1°
ANB	7°	6°	1°
Wits appraisal	AO ahead of BO by 10mm.	AO AHEAD OF BO by 2mm.	8mm
N ⊥ Pt A	9 mm	5 mm	4mm
N ⊥ Pog	2 mm	-4 mm	-2mm
Angle of inclination	80	84°	4°
Go-Gn to SN	32°	30°	2°
Eff. Max. Length	87mm	87mm	0mm
Eff. Mand. Length	104	104mm	0mm
Y- Axis	70°	68°	2°
Facial axis	0°	-2°	-2°
Upper incisor – NA	8 mm	4mm	4mm
Upper incisor – NA	30 °	16°	14°
Upper incisor – SN	118°	100°	18°
Upper incisor to maxillary plane angle	53°	74°	21°
Lower incisor to mandibular plane angle	113°	92°	21°
Lower incisor to NB	3mm	4mm	1mm
Lower incisor to NB	19°	29°	10°
Interincisal angle	122°	129°	7°
Maxillary mandibular planes angle	17°	27°	10°
Lower anterior face height	59 mm	59 mm	0mm
Face height ratio	69 %	66.6 %	2.4%
Lower incisor to APO line	3 mm	-3 mm	0mm

Discussion

Combination of fixed orthodontic treatment and vertical class II elastics is implemented to obtain a stable result for treatment. During diagnosis, the vertical dimension with skeletal morphology need to measure properly for determining that the open bite whether it is dental or skeletal^[8-9]. Proper diagnosis, treatment planning, and retention are critical to achieve the most stable and favourable out-comes for patients with open bite malocclusion^[10]. This case report showed the patient had an anterior open bite with dental component. Treatment for this patient includes maintenance of ideal overbite and overjet relationships, proper intercuspation with midline correction. After finishing the treatment removable orthodontic retainer was provided with proper instructions.

Conclusion

Open bite is an anomaly with distinct, easily recognizable features that can be found in 25% to 38% of orthodontic patients The present case report details the non-surgical orthodontic treatment of an adult patient with a complex anterior open-bite treated using a combination of fixed appliances, and vertical intermaxillary elastics.

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