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CASE REPORT

The orthodontic treatment and one year follow up of adult case with severe openbite

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ABSTRACT

Anterior open bite is an abnormal condition that is caused by dental, skeletal, functional, and pathological factors in dental arches and jaws. An adult woman having Class I relationship on the right side, Class II relationship on the left side and severe anterior open bite with inadequate maxillary incisor exposure demanded treatment without surgical approach. Treatment was performed with preadjusted edgewise appliances accompanying extraction of maxillary left first premolar. As a result, open bite abnormality was treated with satisfactory esthetic outcome coupled with an ideal overjet and overbite relationship.

INTRODUCTION

Several factors have been identified as causes of an anterior open bite malocclusion including inherited facial form, unfavorable growth pattern, posture, sucking habits, nasopharyngeal airway obstruction, and tongue posture function.[1] The main objective of openbite treatment in general is to achieve ideal overbite and overjet relationships.[2] When treating an openbite malocclusion, correction of maxillary and mandibular occlusal planes and axial inclinations of teeth must be undertaken.[1,2] This could be performed by extrusion of anterior teeth using intermaxillary elastics, uprighting of molars with multi-loop edgewise arch wire or inhibition of molar eruption during growth.[3-9] To control the vertical development of jaws in growing patients, relative intrusion of molars is recommended.[10] Correction of severe openbite can be performed with absolute intrusion of posterior teeth by temporary anchorage devices or with orthognatic surgery in adult patients.[11,12]

While satisfactory results can be achieved by orthognathic surgery, the approach is frequently burdened by its complexity, risks, and high cost. The decision-making of the treatment depends on many factors involving esthetic and occlusal aspects,

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morphologic characteristics, and the severity of the abnormality. The purpose of this report is to present conventional orthodontic correction and the one-year postretention follow-up findings of a case with severe open bite and midline shift.

CASE REPORT

A 22 years 2 months old female patient referred to our department with complaints in dental esthetics and phonetics. The patient had allergic asthma, which is known to cause mouth breathing. Asthma in growing patients leads to extension of the head and incorrect positioning of the tongue. The patient was using medications for asthma. The position of the tongue was corrected by suggestions. Clinical examination revealed normal jaw function without temporomandibular joint disfunction and Class I relationship on the right side and Class II relationship on the left side. The cephalometic analysis showed 4° ANB angle, 41° GoGnSn, 403° sum of posterior angles, proclined and protrusive upper incisors, 7 mm overjet and -8 mm overbite (Table 1). Although vertical skeletal measurements were slightly higher than normal values, a tendency toward skeletal deep-bite was determined with 63% ratio in the Jarabak analysis. The maxillary midline was located 3 mm on the right side with accompanying crowding of the maxillary anterior teeth and the mandibuler midline was located 2 mm on the left side due to the loss of mandibular left first premolar. Analysis of the dental casts revealed arch length discrepancies of -4 mm in the upper and -1 mm in the lower arches. The patient was diagnosed to have severe dental open bite. Among the treatment alternatives offered, the patient and her family chose the nonsurgical conventional orthodontic treatment option without use of skeletal anchorage devices. According to the treatment planning, the maxillary left first premolar was extracted and all teeth including the retainers of the fixed denture on the mandibular right side were bonded. The maxillary dental arch was expanded using wide stainless steel archwires, while the mandibular dental arch was slightly contracted using narrow stainless steel archwires. The extraction space was closed with maximum anchorage for correction of crowding and midline shift. Tip-back bends were included to reinforce anchorage and to prevent extrusion of posterior teeth. Intrusive forces generated by the tip-back bends on the maxillary and mandibular incisors were opposed by use of anterior box elastics. The preexisting anterior open bite was successfully eliminated with the retroclination and accompanying extrusion of the maxillary anterior teeth. The active treatment was completed in 23 months. In consequence of orthodontic treatment, a good occlusion with Class I molar and canine relationships with 2 mm overjet and 3,5 mm overbite were obtained (Figures 1-3). The upper and lower dental midlines were aligned with the facial midline. Due to elimination of severe anterior openbite the patient gained proper chewing and speaking functions. Immediately after debonding, vacuum-formed orthodontic retainers were fabricated for both arches (Essix, Dentsply DeTrey GmbH, Konstanz, Germany). These retainers were used all day long for the first 6 months after active treatment and later only during night.

Following 1 year use of removable retention appliances, the steady and balanced occlusion with normal overjet, overbite and Class I posterior relationship was well-maintained (Figure 4). The proper chewing and speaking functions which were acquired due to correction of the severe malocclusion were also well-preserved. In addition, the panoramic and lateral cephalometric radiographs obtained at this

stage proved the stability of all skeletal and dental outcomes of the treatment (Table 1). However, the patient suffered gingival recession due to poor oral hygiene. There were no signs of tooth mobility or periodontal pockets. The teeth were surrounded by firmly attached gingiva. The periodontal status of the patient was examined by a periodontist, who suggested regular check-ups.

Table 1. Cephalometric evaluation of the patient.

	Before treatment	After treatment	One-year post treatment
Skeletal measurements			
SNA	74°	72°	72°
SNB	70°	70°	70°
ANB	4°	2°	2°
Witts	5 mm	0 mm	0 mm
N perp - A	–3 mm	–1 mm	–1 mm
N perp-Pg	–5 mm	–4 mm	–4 mm
Go-Gn/S-N	41,5°	42,5°	42,5°
ANS-Me	77 mm	80 mm	80 mm
Gonial Angle	122°	122°	121
Dentoalveoler measurements			
U1 – NA	6 mm	3 mm	3 mm
U1/PP	125°	99°	98°
L1 – NB	4 mm	4 mm	4 mm
L1/MP	95°	86°	86,5°
U1/L1	108°	141°	140°
Overjet	7 mm	2 mm	2 mm
Overbite	–8 mm	3,5 mm	3,5 mm
Soft tissue measurements			
UL-E line	–4 mm	–6 mm	–5 mm
LL-E line	–2 mm	–3 mm	–2,5 mm

Figure 1A. Pre-treatment intraoral views of the patient.

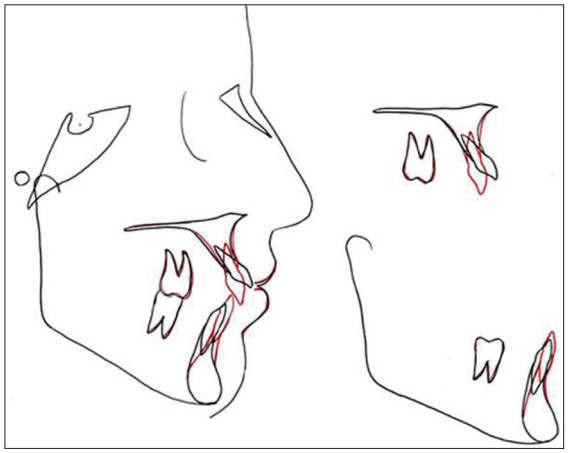

Figure 1B. Post-treatment intraoral views of the patient.

DISCUSSION

The vertical alignment of dentition is influenced by the adaptation of teeth and alveolar processes to the jaw relationship to a great extent. This makes correction of openbite by orthodontic movement alone easier.[1-5] In the present case, the orthodontic treatment did not involve intrusion of molars, although skeletal vertical measurements were relatively higher than normal. The rationale behind the conventional approach without use of skeletal anchorage devices for molar intrusion was that there was a tendency toward skeletal deep-bite (63%) in the Jarabak analysis and no facial disharmony was observed in the patient including lower anterior facial height. Moreover, the patient and her family strongly resisted treatment options involving any surgery or skeletal anchorage devices. Therefore, it was decided to retrocline and extrude the upper anterior teeth to obtain a favorable functional and esthetic result as the patient had increased overjet and severe opnebite with proclined upper incisors and insufficient upper incisor display during smile. In predicting the prospective relaps of the present treatment, the one-year follow-up of this case suggested that lack of relaps at early stages after treatment would be followed by a trivial amount of relaps in the long run.

Multi-loop edgewise arch wire therapy has been demonstrated to be an effective treatment option for the correction of anterior open-bite, as it is able to retract and extrude the anterior teeth while uprighting the posterior teeth.[2,13] The result is predictable even for orthodontic treatment of skeletal open bite cases, although the approach has negligible effects on the skeletal pattern.[13] Indeed, the inventor who had been using the system over two decades did not observe a significant level of relaps in a two-year follow-up study.[1] The disadvantages of the multi-loop edgewise arch wire approach are requirement of high professional skills and patient compliance. The conventional approach used in the present case included use of tip-back bends and anterior box elastics. This mechanism is similar to the practical modification of the

Figure 2A. Pre-treatment extraoral and radiographic views of the patient.

Figure 2B. Post-treatment extraoral and radiographic views of the patient.

Figure 3. Superimposition of lateral cephalometric radiographs of the patient.

Figure 4. One-year follow-up intraoral and radiographic views of the patient.

multi-loop edgewise arch wire technique applied with increased curve of spee in the upper arch and reverse curve of spee in the lower arch, accompanied by anterior vertical elastics.[4] Despite the fact that high dependence on patient compliance was the biggest disadvantage of the system as these mechanics completely worsens the occlusion without use of intermaxillary elastics, correct patient selection avoided any problems related with disuse of elastics.[2,4]

CONCLUSION

Adult patients with severe dental open bite can be successfully treated by using conventional orthodontic mechanics, while satisfactory functional and esthetic

outcomes can be obtained with appropriate treatment planning.

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