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Early correction of a developing class III malocclusion by quick fix appliance: A case report

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Abstract

A 11-years young female patient presented with anterior cross bite. The patient treated at the university of Hama Dental School in Hama city in Syria. The clinical examination showed that The overjet was -2.5mm and deep overbite, it was about 3 mm. Cephalometric analysis indicated that the SNA angel was 81 degree, the SNB was 81 degree, the ANB was 0 degree, the MM was 27 degree, the MP-SN was 36 degree, and the Wits Appraisal was -1.5 mm.

The treatment was achieved with Quick Fix Appliance on the maxillary and Class III elastic with fix appliance on the mandible.

Three cephalometric had taken: T1 pretreatment, T2 after active treatment, T3 after 6 month of active treatment. Good incisal relationships were achieved, and facial esthetics was greatly improved after 6 months of treatment. Stability of the treatment result was excellent in the 9 month follow up. Post-treatment results showed a improvement of SNA to 84 degree, the SNB was stable at 81 degree, the ANB to 3 degree, the overjet improved to 2 mm, and the overbite was 3 mm.

Keywords: Class III malocclusion, anterior cross bite, quick fix appliance, young patient

Introduction

The description of Class III malocclusion is based on a particular dental relationship, but the etiology of such a relationship is often skeletal discrepancy between maxilla and mandible. Common findings of Class III malocclusion are retrognathic and narrow maxilla, prognathic and wider mandible and often a combination of both. In most cases, dentitions are compensated with buccally and labially inclining mandibular dentition and with lingually and palatally inclining mandibular dentition^[1]. Patients with a skeletal Class III malocclusion always complain of an unharmonious profile and poor biting of their occlusion. Most of them are more concerned with their displeasing dental and facial appearances than with a functional deficiency^[2].

Timing of orthodontic treatment, especially for children with developing Class III malocclusions, has always been somewhat controversial, and definitive treatment tends to be delayed for severe Class III cases. Although the interaction between environmental and innate factors in the development of a Class III malocclusion is not completely understood^[3-5].

Class III patients with moderate to severe anterior crossbite and deep bite need early intervention in some selected cases. It is known that both anteroposterior and vertical maxillary deficiency can contribute to Class III malocclusion^[6-7].

If the maxilla does not grow vertically, the mandible rotates upward and forward, producing an appearance of mandibular prognathism that may be attributed to both the position and the size of the mandible. In these cases, the mechanical interference by the over closure of the mandible may influence the growth of maxilla and the alignment of the maxillary dentition. Also, many young children can benefit from treatment because it reduces the psychological burden of facial and dental disfigurements during some of their most formative years^[8]. In this case report, as one of the effective approaches for treating growing Class III patients, a Quick Fix Appliance was used in the late mixed dentition, which is considered a new appliance and dose not depend on the cooperation of the patient.

Case Report**Diagnosis**

The patient was a Syrian girl who was 11 years 5 months old at the time of initial records. Her parents worried about her prominent lower teeth and facial appearance. Her occlusion showed little Class III molar and the upper canines was not emerged yet in her mixed dentition (Figure1). She presented with an anterior crossbite (overjet -2.5 mm), deep bite (overbite 3 mm). The mandibular incisors contacted prematurely in an end-to-end relationship, and the mandible slid anteriorly to complete the occlusal relationship (Figure 2). Oral hygiene and gingival conditions were normal.

The cephalometric analysis showed a skeletal Class III jaw relation (Figure 3). The cephalometric Measurements of this patient were (SNA 81°; SNB 81°, ANB 0°) Table (1).



Fig 1: Pretreatment panoramic radiographs.



Fig 2: Pretreatment photographs and a patient aged 11 years 5 months.



Fig 3: Pretreatment lateral cephalometric radiographs

Table 1: pretreatment cephalometric Measurements

T1= pretreatment			
SNA°	81	Co-Go mm	48
SNB°	81	ANS-Me mm	44
ANB°	0	U1-SN°	97
MP-SN°	36	U1-SPP°	111
SPP-SN°	15	L1-MP°	99
MM°	27	Ovj mm	-2.5
Wits mm	-1.5	Ovb mm	3
Co-Go-Gn°	120	E line-ls mm	-3
Co-Gn mm	96	E line-li mm	-0.5
Go-Gn mm	68		

Treatment objectives

Our treatment objectives were (1) to improve the facial profile, (2) to improve the skeletal jaw relationship as much as possible by redirecting the growth of the mandible toward a downward and backward direction, (3) to accomplish desirable anterior occlusion for establishing functional occlusion, and (4) to follow up the remaining growth to assess the need for further treatment.

Treatment Progress

Before the Quick Fix device is installed, the incisors are leveled and aligned using superelastic round wire in a maxillary 2 × 4 appliance (two banded or bonded first molar tubes and pread-justed brackets on the central and lateral incisors) (Figure4). This phase typically takes two to five months. The Side Swipe auxiliaries are inserted into the molar tubes after leveling and alignment. The wire segment of the Side Swipe is inserted into the molar tube mesially, with the tube of the auxiliary oriented buccally. The Side Swipe is secured to the molar tube with a stainless steel or elastic ligature from the hook on the auxiliary to a hook on the molar tube (Fig.5). Universal arch locks are placed about 16-17mm from the midline mark on the right and left sides of an .016" × .022" stainless steel arch, which will allow seating of the arch wire into the incisor brackets with the arch locks distal to the lateral incisors. Two 20mm lengths of 009" × .030" open-coil spring are slid onto the wire up to the arch locks. The Quick Fix arch wire is inserted into the tubes of the Side Swipes,

rather than into the molar or headgear tubes, so that the excess wire lies adjacent to the molar tubes. The arch wire is then seated into the incisor bracket slots, and a stainless steel ligature is placed across to consolidate the incisors and prevent spaces from opening. The arch locks are loosened with a wrench and slid distally along the wire to compress the open-coil springs; compression is usually sufficient when the locks are positioned near the first premolar (Fig. 6). The locks are then tightened. A distal-end cutter is used to cut the arch wire flush with the end of the molar tube, leaving 4-5mm of wire distal to the Side Swipe and adjacent to the molar tube. The Quick Fix is self-limiting because the wire will slip out of the Side Swipe tube after 4-5mm of advancement. Incisor movement generally takes two to three months. we applied 2×4 on the incisors of lower arch and applied 014 ss with two L shaped loops for relate class III elastics (3/16 medium) Figure (7).

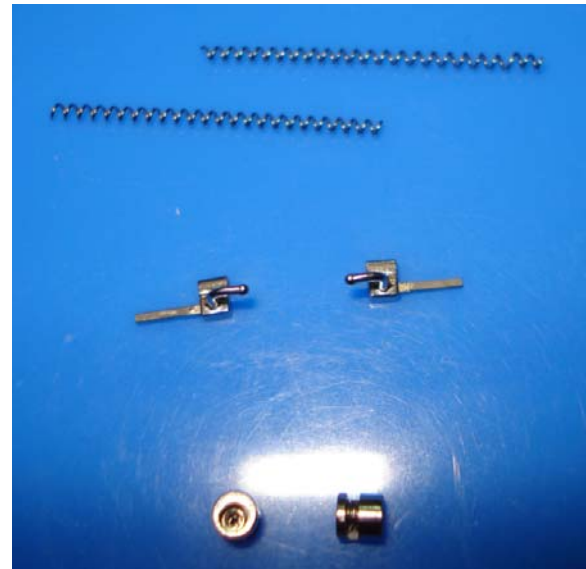


Fig 4: Componentd of Quick Fix appliance

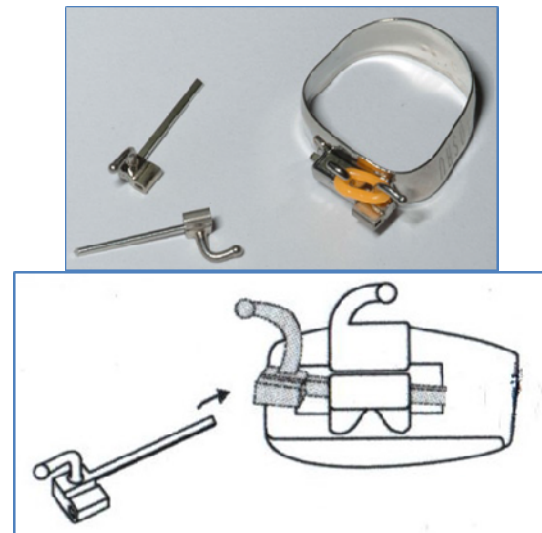


Fig 5: Side Swipe auxiliary inserts into standard molar tube, providing 4-5mm of additional archwire length without excess wire extending distally.



Fig 6: applied QF appliance



Fig 7: L Shaped loops of 014 ss lower arch

Treatment results

After 9 months of active treatment, including 4 months for aligning incisors, the anterior crossbite and deep overbite were corrected and normal functional occlusion was established Figure(8-9).The patient profile was greatly improved.Post-treatment the intraoral photographs and the lateral cephalogram showed that the anteroposterior relationship was improved (ANB 0 → 3°). The maxilla grew anteriorly, (81→84°) and the mandibular was stable (81→81°). The ovejet improved (-2.5→2) and the overbite improved (3→3) Figure (10,12) Tabel (2).



Fig 9: after 3 month of applied QF



Fig 8: edg to edg after applied QF



Fig 10: lateral cephalometric radiographs after active treatment.





Fig 11: photographs of young patient after 6 month of active treatment



Fig 12: lateral cephalometric after 6 month of active treatment

Discussion

The success of orthodontic treatment in a growing patient with a Class III malocclusion depends on his or her individual

growth and the adequate timing of the treatment. In moderate to severe skeletal Class III patients, the decision whether to treat early or to wait until the end of growth is difficult.

Moreover, to what extent the growth modification can be successful is a challenging question for many clinicians. Therefore, it is important to diagnose the degree of skeletal discrepancy in order to develop a proper treatment plan. Here we treated this patient by quick fix appliance. The quick fix appliance is used as an alternative to correct an anterior crossbite in the first phase of treatment. This appliance does not require significant cooperation from as it is comfortable and takes a short time to complete the treatment. The mandibular is controlled using the classIII elastics.

Conclusion

Early correction of Class III malocclusion provides simple, rapid, reliable, and stable resolution of anterior crossbite and associated functional shift. Such treatment reduces the risk of developing a severe skeletal Class III malocclusion and may facilitate or even eliminate the need for Phase II therapy. The Quick Fix device is a simple, predictable, and effective mechanism for correcting a Class III. It can also be adapted for molar distalization in Class II patients, using Class II elastics or miniscrew anchorage to prevent flaring of the incisors.

Table 2: Cephalometric comparison

	T1= pretreatment	T2=after active treatment	T3=after 6 month of active treatment
SNA°	81	84	83
SNB°	81	81	81
ANB°	0	3	2
MP-SN°	36	28	26
SPP-SN°	15	12	13
MM°	27	23	22
Wits mm	-1.5	-1	-1
Co-Go-Gn°	120	114	114
Co-Gn mm	96	100	103
Go-Gn mm	68	67	70
Co-Go mm	48	50	52
ANS-Me mm	44	53	54
U1-SN°	97	100	112
U1-SPP°	111	113	120
L1-MP°	99	92	93
Ovj mm	-2.5	2	2
Ovb mm	3	3	3
E line-ls mm	-3	-2	-2.5
E line-li mm	-0.5	-1	-2

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