

Dental Correction of Mild Skeletal Class III: Case Report

Abstract

This case report describes the non extraction, non surgical treatment of a 12 year old adolescent patient who had Class I malocclusion with anterior crossbite superimposed on mild skeletal Class III malocclusion. She had prognathic mandible and retrognathic maxilla. The patient was treated with fixed orthodontic therapy and protraction utility arch to correct anterior crossbite.

Keywords: Anterior Crossbite, Class III, Crossbite, Utility Arch.

Introduction

Anterior crossbite is defined as a malocclusion resulting from the lingual position of the maxillary anterior teeth in relationship with the mandibular anterior teeth.

Prevalence of anterior crossbite in India is 4% of total malocclusion.

Anterior crossbite in the deciduous dentition may involve one or more anterior teeth and can be differentiated in dental, functional, and skeletal crossbite. A variety of factors have been reported to cause a dental anterior crossbite, including a lingual eruption path of the maxillary anteriors, trauma to the deciduous dentition in which there is displacement of the tooth buds, delayed eruption of the deciduous dentition, supernumerary teeth, and inadequate arch length.¹ Functional crossbite or pseudo-Class III results from an early dental interference that forces the mandible to move forward to obtain maximum intercuspation. An acquired muscular reflex pattern during closure of the mandible is involved in functional crossbites. Skeletal crossbite, the rarest of the three, is associated with a discrepancy in the size of the maxilla and the mandible and a Class III malocclusion. It must be stressed that there is always a very strong skeletal component in anterior crossbites and that the vast majority of the 10-year-old patients with Class III malocclusions grow that way through time from "pseudo" 3-year-old occlusions. This strengthens the argument toward early treatment of a full anterior crossbite.

The Skeletal Class III malocclusion is characterized by mandibular prognathism, maxillary deficiency or both.^{2,3,4} Clinically, these patients exhibit a concave facial profile, a retrusive nasomaxillary area and a prominent lower third of the face. The lower lip is often protruded relative to the upper lip. The upper arch is usually narrower than the lower, and the overjet and overbite can range from reduced to reverse.⁵ The effect of environmental factors and oral function on the etiological factors of a Class III malocclusion is not completely understood. However, there is a definite familial and racial tendency to mandibular prognathism.^{6,7} For many Class III malocclusions, surgical treatment can be the best alternative. Depending on the amount of skeletal discrepancy, surgical correction may consist of mandibular setback, maxillary advancement or a combination of mandibular and maxillary procedures. After surgical correction of the skeletal discrepancy, the occlusion is usually finished orthodontically to a Class I relationship. Dental crossbite can be corrected using removable appliances or short span fixed wire orthodontics.^{8,9} This case report that follows describes the orthodontic treatment of a patient with anterior crossbite. The approach used combines interesting clinical procedures and methods for the solution of this problem.

Patient reported with the chief complaint of forwardly placed lower jaw.

Diagnosis and Etiology

MM a female patient aged 11 years 5 months (Fig. 1) had a Class I molar relation with anterior crossbite in relation to right and left maxillary central incisor and right maxillary lateral incisor with maxillary anterior crowding. Maxillary right canine is highly placed. Maxillary right second



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premolar in crossbite with mandibular right second premolar (Fig. 2). Mandibular arch is more or less well

aligned (Fig. 3, 4, 5)



Fig.1



Fig.2



Fig.3



Fig.4



Fig.5

Extraoral examination presented a symmetric leptoprosopic face. Profile is straight with slight anterior divergence. Lips are competent with protrusive lower lip and retrusive upper lip. Nasolabial angle is increased and mentolabial sulcus is shallow (Fig.6, 7)



Fig. 6



Fig. 7

Cephalometric analysis indicated Class III skeletal pattern with SNA=78 SNB=83 and ANB= -5. The skeletal problem was due to a combination of maxillary deficiency and mandibular prognathism.

Treatment Objectives

The treatment objectives were correcting the anterior crossbite, achieving normal overjet and overbite, achieving Class I molar and canine relationships, eliminating the anterior functional shift and establishing canine guidance, improving facial appearance and correcting appearance of prognathic mandible, correcting crowding in both the arches, correcting mandibular midline deviation and to provide an aesthetic smile.

Treatment Plan

The treatment plan included non extraction; banding all 4 molars, bonding both arches from canine to canine, including premolars; leveling and aligning with continuous arch mechanics in mandibular arch and segmental mechanics in maxillary arch; raising the bite; using maxillary protraction utility arch; and finishing and retaining.

Treatment Progress

Fabrication of posterior bite block: Upper and lower alginate impressions were made after banding upper molars and cast poured. Bite registration was made in patient's mouth. The models were articulated and upper posterior acrylic bite blocks were fabricated on metal framework (Fig.8). Bite blocks were then cemented intraorally (Fig. 8,9,10)



Fig.8



Fig.9



Fig.10

The malocclusion was treated with 0.022" MBT brackets and straight wire technique. Continuous 0.012" NiTi was engaged in lower arch. In upper arch, posterior bite block was fabricated.

Only upper incisors were bonded forming 2x4 appliance. 0.017"x 0.025" CNA utility arch wire was engaged into maxillary central incisors for protrusion. Segmental 0.012" NiTi engaged into

maxillary posterior teeth. At monthly follow up visits, patient was assessed for signs and symptoms of TMD. In subsequent visits the upper wire was engaged in all the brackets. Posterior bite blocks were removed after 4 months as crossbite was corrected. The result so far was achieved in a span of 9 months (Fig. 11, 12, 13, 14, 15). Planned removal of fixed appliance after closure of 1mm spacing distal to 11.



Fig.11



Fig.12



Fig.13



Fig.14



Fig.15

Treatment Results

Post treatment extra oral pictures show improvement in profile (Fig.16). There is better upper lip support. Intraorally, upper and lower teeth are aligned with positive overjet and overbite. Class I molar relation was maintained and anterior crossbite was corrected. The panoramic radiograph demonstrated proper root parallelism with no apical root resorption. Maxillary and mandibular cephalometric superimpositions confirmed that upper incisors were proclined labially.



Fig.16

Discussion

Anterior crossbite can be dental or due to underlying skeletal problem. The cause and expression must be identified and understood to enable formulation of effective treatment plan – whether orthodontic, orthopedic, surgical or a combination of these modalities. Anterior crossbite can also be corrected using bonded resin composite slopes, catalan's appliance.¹⁰

In this case, the proclination of maxillary central incisors created sufficient space for alignment of maxillary anterior teeth and correction of crossbite. Satisfactory occlusal and esthetic results were attributed to significant dentoalveolar compensation and excellent patient compliance.

Utility arch used in maxillary arch for proclination of incisors was introduced by Ricketts.¹¹ Originally utility arch was fabricated of blue elgiloy but in this case CNA (Beta Titanium) was used to fabricate utility arch. CNA exerts light, continuous force for long duration. Low forces minimize root resorption.

Conclusion and Clinical Implications

In the present case, dental Class I superimposed on mild skeletal Class III malocclusion

was treated non extraction with MBT mechanics. Bite was raised and protraction utility arch was used in maxillary arch to correct anterior crossbite. Light continuous forces were used to correct anterior crowding and crossbite in a span of 9 months.

Endnotes

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