



CASE STUDY

NON-SURGICAL TREATMENT OF A PATIENT WITH SKELETAL CLASS III MALOCCLUSION USING CLASS III INTERMAXILLARY ELASTICS

**Dr. Bhushan Jawale, *Dr. Priyanka Thakur, Dr. Sheetal Potnis, Dr. Ketan Vora,
Dr. Sandesh Baralay and Dr. Swapnil Pardeshi**

Department of Orthodontics & Dentofacial Orthopedics, Sinhgad Dental College & Hospital, S. No 44/1, off Sinhgad Road, Vadgaon (BK), Pune - 411041, Maharashtra, India

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ABSTRACT

This case report describes the orthodontic treatment of a 16 year-old woman with a skeletal Class III malocclusion. Nonsurgical orthodontic treatment of the patient with true & pseudo Class III malocclusion, reverse overjet, increased overbite is described. Although the treatment options included an orthognathic approach, high cost of the surgical procedure was the main reason for extreme dental compensation to have been performed. Intermaxillary Class III elastics were used to correct the malocclusion at the expense of increasing the initial dental compensation. Satisfactory and stable occlusion was achieved with dental and smile esthetics improvement along with significant facial profile improvement. The clinical results and implications of compensatory treatment as well as its relevance within the patient context are discussed based on scientific evidences which is a significant nonsurgical cost effective orthodontic approach for treatment of Class III malocclusion.

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INTRODUCTION

Class III malocclusions are usually growth related discrepancies that often become more severe until growth is complete (Franchi *et al.*, 2004). Facial changes can influence a patient's self-confidence and interpersonal relationships (Heldt *et al.*, 1982; Kondo *et al.*, 2000). The success of early orthodontic treatment in patients with Class III anomalies depends on facial skeletal development and type of treatment, but, in some cases, surgery can be part of the treatment plan (Kuroda *et al.*, 2005). When it is associated with an open-bite tendency and unfavourable growth pattern, correction of a Class III relationship without orthognathic surgery can be challenging (Kondo *et al.*, 2000). However, a mild vertical growth pattern tendency can be corrected with good treatment protocol and satisfactory patient compliance. Therefore, the purpose of this article was to describe the nonsurgical treatment of a patient with Class III dental and skeletal relationships using intermaxillary Class III elastics. Malocclusion correction based on the use of intermaxillary elastics is difficult and controversial (Janson *et al.*, 2000). However, if it is well indicated in a compliant patient, it can

provide satisfactory results (Janson *et al.*, 2000, Hanes *et al.*, 1959, Ellen *et al.*, 1998). This article was to present the successful orthodontic treatment of a Class III malocclusion patient with intermaxillary elastic forces. This procedure allowed obtaining a good and stable occlusal relationship and a better esthetic facial profile and smile for the patient (Janson *et al.*, 2010).

Case Description & Results

The patient was a 16-year-old girl in good health. She was mesomorphic, weighed 48 kg and was 5 feet 6 inches tall. She had a long, ovoid-tapering face and a mesocephalic head. Her profile appeared to be prognathic, but on a closer inspection, it appeared that there was also a maxillary deficiency. The mentalis and perioral musculature was abnormal. The pattern of eruption appeared to have been normal. The patient was very concerned about her "crossbite," and was motivated. On intraoral examination a Class III molar relationship with bilateral crossbite was found. The anterior crossbite produced a deepbite of 8 mm and a reverse overjet of 3 mm. The mandibular arch form was ovoid and tapering with a moderate curve of Spee. Cephalometric analysis showed a skeletal dysplasia with a midface deficiency (retrognathism) and a mandibular prognathism (SNA and SNB of 79° and 83.5°, respectively). The lower anterior facial height was deficient at

*Corresponding author: Priyanka S. Thakur,

Department of Orthodontics & Dentofacial Orthopedics, Sinhgad Dental College & Hospital, S. No 44/1, off Sinhgad Road, Vadgaon (BK), Pune - 411041, Maharashtra, India.

59 mm. The dentoalveolar description showed the mandibular incisors were in retrusion with a Frankfort mandibular incisor angle of 75° and were in anterior crossbite with the maxillary incisors. The soft-tissue analysis showed a profile with a prognathic mandible and a deficient maxilla. All four third molars were forming. The crestal bone and the root formation of the teeth appeared to be within normal limits. Three treatment options were suggested to the patient and his parents. The first alternative consisted of combined surgical and orthodontic treatment with a high LeFort procedure and mandibular osteotomy to improve maxillary and facial appearance. The second consisted of extraction of the mandibular first premolars. This would correct the Class III dental relationship, but it would also involve retraction of the already retruded mandibular incisors without protrusion of the maxillary incisors; this was thought to be unsatisfactory for this patient's retruded Maxilla. The other treatment alternative was a nonextraction fixed orthodontic approach with use Intermaxillary Class III elastics to correct the malocclusion at the expense of increasing the initial dental compensation. The patient and parents did not want orthognathic surgery and tooth extractions. Therefore, they choose this non extraction orthodontic treatment.

On the basis of the severity of the Class III malocclusion, the available space on the mandibular arch, and the fact that the patient was going to be evaluated for possible orthognathic surgery, it was decided not to extract any teeth. Treatment began with first placing bands and bonding 0.022 \times 0.028 slot MBT appliance in maxillary arch. The archwire sequence progressed from 0.016-in nickel-titanium alloy to 0.019 \times 0.025-in rectangular stainless steel archwires. Concurrently, Class III intermaxillary elastics were given. Class III elastics with rectangular archwires were used for 9 months. After the anteroposterior discrepancy correction, the elastics were used during sleeping hours for 3 months until appliance removal. Patient cooperation in using the elastics was excellent. Treatment time was 1 years 3 months. After debonding, a maxillary Hawley retainer was delivered for both the arches. The facial photographs show improvement in the facial profile. The intraoral photographs show a bilateral Class I molar and canine occlusion with normal overjet and overbite. Good intercuspation, interproximal contacts, and satisfactory root parallelism were achieved. Maxillary incisors were labially tipped and slightly protruded, and the maxillary molars were slightly mesially displaced. The mandibular incisors were



Fig. 1. Pretreatment facial and intraoral photographs



Fig. 2. Pre treatment radiographs



Fig. 3. Class III Intermaxillary elastics



Fig. 4. Post treatment facial and intraoral photographs

slightly lingually tipped and retracted. The attained occlusion was functionally normal with ideal straight facial profile. There was also an increase in upper lip projection, and the mandible underwent slight clockwise rotation. The patient was satisfied with his dental and facial appearance

DISCUSSION

Patient compliance in using Class III elastics was crucial for success. The effects of Class III elastics caused a small maxillary protrusion, and the mandible had a small retrusion, probably consequent to the backward and downward rotation that this apical base experiences when Class III elastics are used (Franchi *et al.*, 2004, Stewart *et al.*, 1978, Schudy *et al.*, 1968). These changes in the apical anteroposterior position contributed to the improvement in their relationship. Accordingly, concomitant increases in the growth pattern angles were observed. However, these are also expected changes with Class III elastics (Janson *et al.*, 2005, Stewart *et al.*, 1978, Ellen *et al.*, 1998, Schudy *et al.*, 1968). The occlusal plane experienced a small counterclockwise rotation under the influence of the Class III elastics; this is a normal result from these elastics (Janson *et al.*, 2005, Stewart *et al.*, 1978, Kondo *et al.*, 2005, Pinho *et al.*, 2004, Lin *et al.*, 2003). The maxillary incisors were labially tipped and protruded, and

the mandibular incisors were lingually tipped and retruded. The vertical component of the elastics produced small extrusions of the maxillary molars and mandibular incisors. As a consequence of these skeletal and dentoalveolar changes, there was a decrease in the nasolabial angle, protrusion of the upper lip, and retrusion of the lower lip, significantly improving his facial profile. (Janson *et al.*, 2010) It has been stated that anteroposterior intermaxillary elastics produce significant vertical adverse effects (Stewart *et al.*, 1978, Ellen *et al.*, 1998, Highley *et al.*, 1960; Lin *et al.*, 2003; Tweed *et al.*, 1945; Fischer *et al.*, 1948). This can be true if their use is not properly monitored. Use of the correct resistant torques in the maxillary and mandibular incisors to counteract the Class III elastic forces on these teeth is essential. The use of Class III elastics also causes backward and downward mandibular rotation (Janson *et al.*, 2005, Stewart *et al.*, 1978, Lin *et al.*, 2003). The backward mandibular rotation is favorable for correcting a Class III malocclusion because it improves the anteroposterior discrepancy of the apical bases. Stability of the correction was addressed by using Class III elastics during 3 months of nighttime wear, after correction of the anteroposterior discrepancy. Nevertheless, follow-ups every 6 months are recommended for at least 2 years (Janson *et al.*, 2005, Suri *et al.*, 2003). Treatment with intermaxillary elastics is also suspected of causing much relapse (Riedel *et al.*, 1960).

This might be true if active retention is not used for a sufficient amount of time after correcting the anteroposterior Class II or Class III discrepancy. It is not the orthodontic appliance or device that determines treatment stability but the way it is used and especially if enough active retention time was used before the patient was finished. Therefore, the stability obtained in this patient, treated with Class III intermaxillary elastics, seems to illustrate this principle. Evidently, an orthodontic-surgical approach could have produced greater skeletal correction of the Class III discrepancy, but the treatment should aim to solve the patient's primary concern. (Janson *et al.*, 2010, Eisenhauer *et al.*, 2002, Bilodeau *et al.*, 1996). Because this patient's concern was primarily his dental appearance, the clinician obtained the most from the orthodontic mechanics available to satisfy his needs.

Conclusion

Successful occlusal and esthetic correction with satisfactory long-term stability of a Class III malocclusion can be accomplished with Class III intermaxillary elastics when patient compliance in using the elastics is satisfactory.

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