

Non-extraction Orthodontic Treatment of Class III Subdivision Malocclusion: A Case Report

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Abstract

Introduction: Correcting a Class III subdivision malocclusion is usually a challenge for an orthodontist, especially if the patient's profile does not allow for any extractions. One treatment option is to use asymmetric intermaxillary elastics to correct the unilateral anteroposterior discrepancy. However, the success of this method depends on the individual response of each patient and his or her compliance in using the elastics. **Case Report:** This case report presents a 23-year-old male who had Class III subdivision malocclusion. He had straight profile. Intraoral examination showed mild crowding on upper and lower anterior teeth. The treatment plan consisted of an extraction mandibular third molars and MBT prescription bracket. Following the treatment, a satisfactory result was achieved with an ideal facial profile. **Conclusion:** A good occlusion and Class I molar relationship can be achieved with asymmetric Class III elastics and third molar extraction when patient compliance in using the elastics is satisfactory.

Keywords: Class III subdivision, Malocclusion, Non-extraction.

INTRODUCTION

Class III subdivision malocclusions can have a variety of orthodontic treatment options such as nonextraction protocols with intermaxillary elastics, unilateral extraction of 1 mandibular premolar on Class III side, or extraction of 2 mandibular premolar and 1 maxillary premolar extraction on the Class I side.¹⁻⁵

Malocclusion correction based on the use of intermaxillary elastics is difficult and controversial. However, if it is well indicated in a compliant patient, it can give a satisfactory results. The purpose of this article is to present a successful treatment of Class III subdivision patient with non extraction approach.

In this study, the treatment plan considered to present a successful treatment of Class III subdivision

patient with non extraction approach.

DIAGNOSIS AND ETIOLOGY

A 23-year-old male presented with a chief complaint of irregular front teeth. Clinical examination revealed crowding on upper and lower teeth, Class I molar relationship on the right and Class III molar relationship on the left. Figure 1 initial examination showed crowding on upper and lower teeth. Figure 2 showed panoramic radiograph and lateral cephalometric.

TREATMENT OBJECTIVES

The treatment objectives are to obtain optimum overjet and overbite, to establish stable occlusal relationship, to achieve canines and molars class I relationship and to improve the facial features.

TREATMENT ALTERNATIVES

Orthodontics alone without surgery could help camouflage some skeletal and dental aspects of the malocclusion. In this case, several options gave to the patient, there were:

1. Extraction of the mandibular third molars and use Class III elastic to establish Class I dental relationships.
2. Extraction of the mandibular second premolars and close the extraction space by distalization first premolar and mandibular anterior teeth, this treatment did not change the molar relationship, so it remained as a Class III molar relationship.
3. Distalization the mandibular dentition with TSADs to establish Class I dental relationships.

After discussing treatment objectives and alternatives with the patient, he preferred to take advantage of the mandibular third molar extraction and use Class III elastic.

TREATMENT PROGRESS

Cephalometric analysis indicated skeletal Class I malocclusion. The treatment plan consisted of extraction of mandibular third molars and 0.022-in MBT prescription bracket. Initial archwire used was 0.014 nickel titanium on both arch. Wire sequencing was followed by 0.016, 0.016 x 0.016, 0.016 x 0.022 inch nickel titanium and working wire 0.017x 0.025 inch stainless steel. Alignment was completed withing 8 months. Distal movement of mandibular dentition was carried out with Class III elastics.

Finishing and artistic positioning was done with 0,017 x 0,025 SS archwire. Figure 3 after 15 months of treatment, a satisfactory result was achieved with a stable and functional occlusion, and an ideal facial profile. Figure 4 showed panoramic radiograph and cephalometric analysis after treatment.

TREATMENT RESULT

After 15 months of treatment all treatment objectives were achieved and the appliances were removed. Teeth were well leveled and aligned, and ideal overbite and overjet were established with molars, premolars, and canines in a Class I relationship. Correction of the dental Class III relationship performed through mandibular third molars extraction and the use of Class III elastics.

Lateral cephalometric analysis showed no skeletal changes in maxilla and mandible. To correct his anterior crossbite, his maxillary incisors were proclined compared with pretreatment (U1-NA: from 28° to 33° and 4 mm to 8 mm), and her mandibular incisors were proclined compared with pretreatment (U1-NB: from 23° to 27° and 5.5 mm to 8.5 mm), interinsisal changes from 131° to 126°, occlusal to SN slightly changes from 11° to 10°, and E-line lower lip also slightly changes from 1 mm to 1.5 mm.

DISCUSSION

For asymmetric molar relationships, unilateral lower molar distalization is a challenge for orthodontists. Temporary anchorage devices applications have been shown to optimize orthodontic mechanics, require minimal patient cooperation, and minimize the adverse side effects. Recent studies have been directed toward the use of miniscrews miniplates for intrusion or distalization of the mandibular posterior teeth. A distalizing force is applied through a nickel-titanium coil spring while connecting the miniscrew to hooks on the archwire for indirect anchorage.^{6,7}

The other alternative is to use Class III elastics. Patient compliance in using asymmetric 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. These changes in the apical antero-posterior position contributed to the improvement in their relationship. Accordingly, concomitant increases in the growth pattern angles were observed, with the exception of the

occlusal plane angle to SN. However, these are also expected changes with Class III elastics.^{8,9} The occlusal plane experienced a small counter clockwise rotation under the influence of the Class III elastics; this is a normal result from these elastics.⁹⁻¹¹



Fig 1. Pre-treatment facial and intraoral photograph.



Fig 2. Pre-treatment radiographs: A, lateral cephalogram; B, panoramic radiograph.



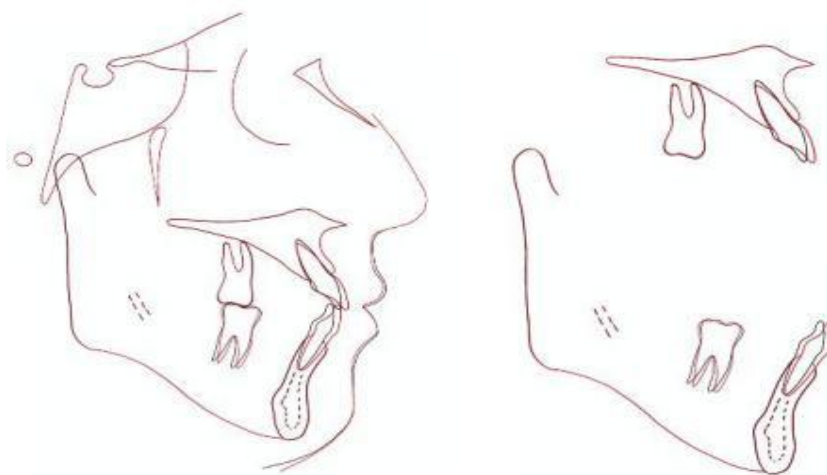
Fig 3. Post-treatment facial and intraoral photograph.



Fig 4. Post-treatment radiographs: A, lateral cephalogram; B, panoramic radiograph.

Table 1. Cephalometric summary

<i>Parameter</i>	<i>Norm (mean \pm SD)</i>	<i>Pre- treatment</i>	<i>Post- treatment</i>
Cephalometric			
SNA ($^{\circ}$)	82	85	85
SNB ($^{\circ}$)	80	82	82
ANB ($^{\circ}$)	2	3	3
Occlusal to SN (mm)	15	11	10
U1-NA (mm)	4	4	8
U1-NA ($^{\circ}$)	22	28	33
L1-NB (mm)	4	5,5	8,5
L1-NB ($^{\circ}$)	25	23	27
Interincisal ($^{\circ}$)	131	126	117
E-Line to upper lip (mm)	2-3	2.5	2.5
E-Line to lower lip (mm)	1-2	1	1.5
Nasolabial ($^{\circ}$)	102	102	101

**Fig 5.** Cephalometric superimpositions: *black line*, pre-treatment; *red line*, post-treatment

The maxillary incisors were labially tipped and protruded, and the mandibular incisors were lingually tipped and retruded. The vertical component of the elastics can produced small extrusions of the maxillary molars and mandibular incisors. If the patient's compliance had not been good in using the elastics, another option would have been to extract the mandibular left first premolar.

It has been stated that anteroposterior intermaxillary elastic produce significant vertical adverse

effects.^{11,12} 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. In this patient, the adverse effects seem to have been well controlled, because only small extrusions of the maxillary molars and mandibular incisors were apparent (Table 1).

Inclusion of the second molars might also have helped in controlling the

adverse effects of the elastics. Class III elastics especially are believed to cause counter clockwise rotation of the occlusal plane and inversion of the natural esthetic smile line.⁹ A small counter clockwise rotation of the occlusal plane occurred, but with no significant negative influence on the smile line because of its use (Figure 5).

From the post-treatment cephalometric, there were slight labial tipping and protrusion of the maxillary incisors and mandibular incisors (Figure 5), because the mandibular incisors were slightly crowded before treatment.

Consequently, the maxillary incisors also experienced some labial tipping through their relationship with the mandibular incisors. The occlusal plane angle also slightly increased, showing a tendency to return to its original angulation. This might have contributed to the use of Class III elastic.

The mild counter clockwise rotation of the mandible shows the temporary characteristic of the mandibular rotation after treatment.^{13,14} However, these post-treatment cephalometric changes were small and did not compromise the occlusal and esthetic results.

CONCLUSIONS

A good occlusion and Class I molar relationship can be achieved with asymmetric Class III elastics and third molar extraction when patient compliance in using the elastics is satisfactory.

REFERENCES

1. Janson G., Woodside DG., Metaxas A., Henriques JFC., Freitas MR. Orthodontic treatment of subdivision cases. *World J Orthod* 2003; 4: 36-46.
2. Wertz RA. Diagnosis and treatment planning of unilateral Class II malocclusion. *Angle Orthod* 1975; 45: 85-94.
3. Janson G., DeSouza JE., Alves FA., Andrade PJr., Nakamura A., deFreitas MR et al. Extreme dentoalveolar compensation in the treatment of Class III malocclusion. *Am J Orthod Dentofacial Orthop* 2005; 128: 787-94.
4. Cheney EA. The influence of dentofacial asymmetries upon treatment procedures. *Am J Orthod* 1952; 38: 934-45.
5. Burstone CJ. Diagnosis and treatment planning of patients with asymmetries. *Semin Orthod* 1998; 4: 153-64.
6. Oncag G., Seckin O., Dincern B., Arikan F. Osseointegrated implants with pendulum springs for maxillary molar distalization: a cephalometric study. *Am J Orthod Dentofacial Orthop* 2007; 131: 16-26.
7. Jing Y., Han X., Guo Y., Li J., Bai D. Nonsurgical correction of a Class III malocclusion in an adult by miniscrew assisted mandibular dentition distalization. *Am J Orthod Dentofacial Orthop* 2013; 143: 877-87.
8. Bilodeau JE. Class III nonsurgical treatment: a case report. *Am J Orthod Dentofacial Ortho* 2000; 118: 560-5.
9. Janson G., De Souza JE., Alves FA., Andrade PJr., Nakamura A., deFreitas MR., et al. Extreme dentoalveolar compensation in the treatment of Class III malocclusion. *Am J Orthod Dentofacial Orthop* 2005; 128: 787-94.

10. Kondo E., Ohno T. Nonsurgical and nonextraction treatment of a skeletal Class III patient with severe prognathic mandible: long-term stability. *World J Orthod* 2001; 2: 115-26.
11. Lin J., Gu Y. Preliminary investigation of nonsurgical treatment of severe skeletal Class III malocclusion in the permanent dentition. *Angle Orthod* 2003; 73: 401-10.
12. Habar EH, Ruslin M. Treatment of skeletal Class III malocclusions with a combination of orthodontic treatment and orthognatic surgery. *J Case Rep Dent Med*. 2020; 2: 40-2.
13. Garib DG., Henriques JF., Carvalho PE., Gomes SC. Longitudinal effects of rapid maxillary expansion. *Angle Orthod* 2007; 77: 442-8.
14. Ferro A., Nucci LP., Ferro F., Gallo C. Long-term stability of skeletal Class III patients treated with splints, Class III elastics, and chincup. *Am J Orthod Dentofacial Orthop* 2003; 123: 423-34.