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Orthodontic Management of Dentoskeletal Class I Malocclusion with Anterior Crossbite and Bimaxillary Crowding – A Case Report

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Abstract

Introduction: Dentoskeletal Class I malocclusion is a common skeletal pattern characterized by normal anteroposterior jaw relationship but often accompanied by dental discrepancies such as bimaxillary crowding and anterior crossbite. These discrepancies can result in edge-to-edge bite, insufficient overjet, and functional disturbances, indicating the need for orthodontic intervention. **Case Report:** A 30-year-old patient presented with uncomfortable biting and protrusive incisors. Clinical examination revealed crowding in both arches, edge-to-edge incisor relationship, and a single-tooth anterior crossbite involving teeth 11 and 41. Radiographs confirmed skeletal Class I malocclusion with dental Class I type 1. Treatment involved a non-extraction approach using 0.022-inch MBT straight-wire appliance with interproximal reduction in the lower anterior teeth to create space for alignment and overbite correction. **Discussion:** After 17 months of treatment, the occlusion was harmonized with proper cusp contacts, anterior crowding was resolved, overbite increased from 0.5 mm to 1.5 mm, and overjet from 0.5 mm to 1 mm. Radiographs confirmed stable root positions and improved sagittal relationships. Functional and aesthetic outcomes were achieved without extractions, demonstrating the effectiveness of non-extraction MBT treatment in Class I malocclusion with crowding and anterior crossbite**.** **Conclusion:** Non-extraction orthodontic treatment using MBT brackets effectively corrected bimaxillary crowding and single-tooth crossbite in a dentoskeletal Class I patient, achieving stable, functional, and aesthetic results within 17 months.

Keywords: Anterior crossbite, Bimaxillary crowding, Dentoskeletal class I malocclusion

INTRODUCTION

Dentoskeletal Class I malocclusion is a condition in which the anteroposterior relationship between upper and lower jaws is within the normal ANB angle of 0-4 degrees. This malocclusion is often accompanied by tooth position anomalies such as crowding, which is one of the most common types of positional anomalies, particularly in American and Asian populations, with mandibular crowding being more common than maxillary crowding. Despite the normal-looking skeletal relationship, space discrepancy in the arches may cause significant occlusal disturbances, thus requiring treatment.[1]

Class I malocclusion with bimaxillary crowding and/or single-tooth crossbite can be treated effectively using non-extraction method using conventional brackets system. This approach allows controlled and efficient tooth movement without removing any healthy tooth. In this case, 0.022-inch McLaughlin, Bennett and Trevisi (MBT) bracket system was employed in combination with elastics to correct the spatial discrepancies, while retaining the integrity of the arches.[2,3]

This case presents a patient with

dentoskeletal Class I malocclusion, single tooth crossbite and bimaxillary crowding. Conventional braces were chosen based on the patient's preference, allowing for controlled tooth movement, space closure, and bite correction, ultimately leading to a stable and functional result.

DIAGNOSIS AND ETIOLOGY

A 30-year-old patient came with a chief complaint of uncomfortable bite. Clinical examination revealed a protrusive incisors profile with crowding in upper and lower arches. The patient had an overjet of 0.5 mm with edge-to- edge incisor relationship. A single tooth crossbite was found, involving teeth 11 and 41. A genetic predisposing factor contributed in the uneven bite. Intraoral examination showed Class I type 1 dental relationship, with a skeletal Class I malocclusion as indicated by radiographic findings (Fig. 1). The diagnosis was dentoskeletal Class I Type 1 malocclusion.

TREATMENT OBJECTIVES

The treatment objectives are to address the edge-to-edge bite relationship, insufficient overjet, crossbite between teeth 11, 41 and crowding in both arches as seen in the initial examination (Fig. 2). This is achieved by utilizing straight-wire appliance (SWA) with MBT prescription. Interproximal slicing would be done to lower anterior teeth to provide enough space for retraction. Vertically, the goal is to increase overbite utilizing stainless-steel rectangular archwires.

TREATMENT ALTERNATIVES

In cases of dentoskeletal Class I malocclusion with bimaxillary crowding, non-extraction orthodontic treatment can be effective. This approach is supported by Nugraha et al. (2025) and Chikankar et al. (2024), who demonstrated that crowding and anterior discrepancies can be corrected successfully through leveling, alignment, space closure, and precise finishing without the need for extractions.[4,5]

TREATMENT PROGRESS

The treatment duration was 17 months. In the maxillary arch, molar bands and buccal tubes were placed on teeth 17 and 27, while brackets were bonded on 16 and 26. SWA brackets with MBT prescription, 0.022-inch slot, were bonded on teeth 15, 14, 13, 12, 11, 21, 22, 23, 24, and 25.

Levelling and alignment were carried out using a progressive nickel–titanium sequence (0.014 → 0.016 → 0.018 SS with mesial stops → 0.016×0.016 NiTi), with careful control of overjet and overbite. Finishing and occlusal detailing were completed with stainless-steel rectangular 0.017×0.025 archwires, after which the maxillary arch was stabilized and transitioned to retention.

In the mandibular arch, molar bands and buccal tubes were placed on teeth 47 and 37, and brackets were bonded on 46 and 36. SWA MBT brackets (0.022-inch) were bonded on teeth 45, 44, 43, 42, 41, 31, 32, 33, 34, and 35. Leveling and alignment followed the same progressive sequence (0.014 NiTi + cinch-back → 0.016 NiTi + cinch-back → 0.018 SS with mesial stops → 0.016×0.016 NiTi), with overjet and overbite controlled throughout.

Interproximal reduction (slicing) was performed on the lower anterior teeth to create space and facilitate alignment. Final finishing and occlusal adjustment were accomplished using stainless-steel 0.017×0.025 archwires, and the mandibular arch was then stabilized and placed on retention.

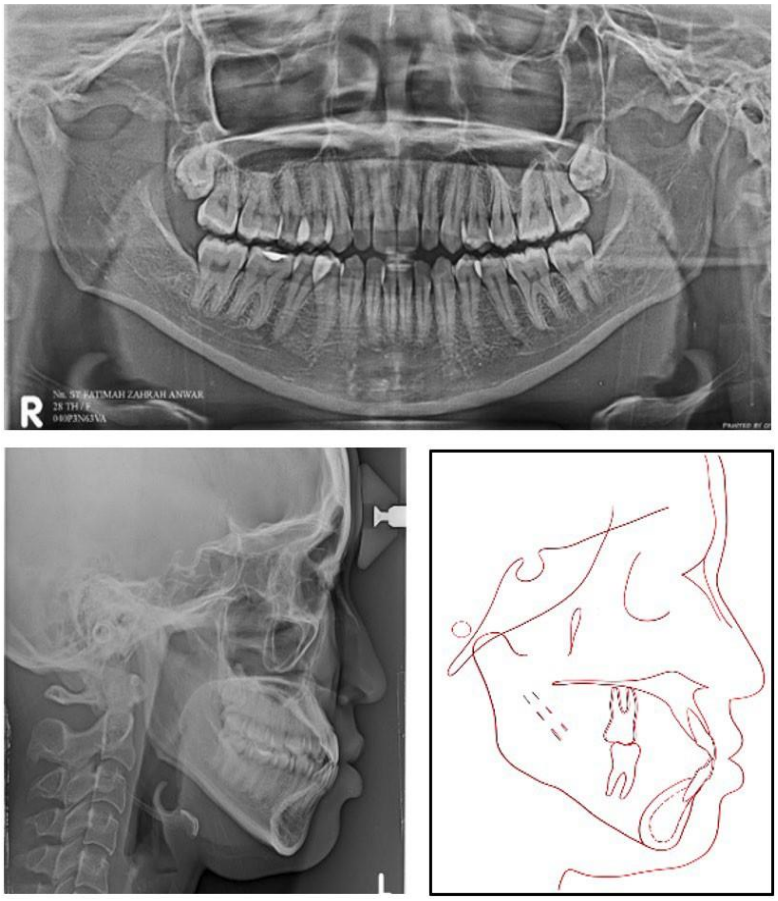

Fig. 1. Pre-treatment panoramic and cephalometric radigraph

Fig. 2. Initial examination

TREATMENT RESULT

Results of the treatment are the harmonious cusp contacts (chief complaint), resolved edge-to-edge incisor relationship and crowding in anterior teeth, increased overbite to 1.5 mm and to 1 mm (Fig. 3). Post-treatment radiographs confirmed stable root positions and improvements in sagittal relationship (Fig. 4). Post-treatment cephalometric measurements were within normal level (Table 1).

DISCUSSION

The results of this case report align with the study by Narmada et al., confirming the effectiveness of conventional orthodontic treatment using MBT brackets in dentoskeletal Class I case with a single- tooth crossbite and bimaxillary crowding with non-extraction method.[3] An aesthetic appearance was achieved while maintaining good cephalometric values by correcting the discrepancies. Similarly, Vijayalakshmi et al. also reported successful treatment outcomes with MBT brackets, further supporting the efficacy of the treatment.[6]

Adequate planning and biomechanical knowledge are required when utilizing the MBT system. In single tooth crossbite cases, various techniques can be used, such as wire bending, auxiliary springs, or inverted brackets if wire bending is not preferred.[7,8]

Fig. 3. Post-treatment photograph

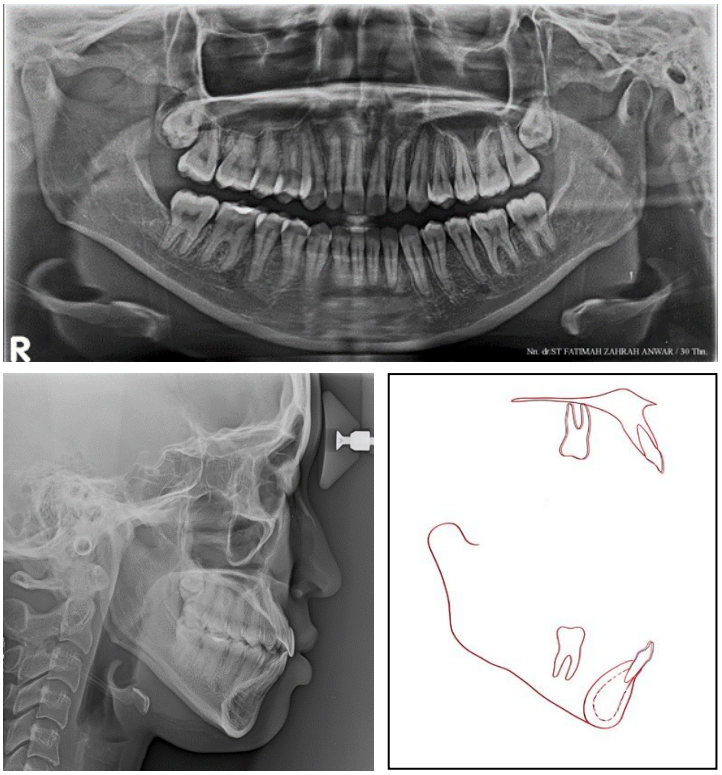

Fig. 4. Post-treatment panoramic and cephalometric radiograph

Table 1. Post-treatment Cephalometric Measurement

	Normal	Pre	Post
SNA (°)	82 ± 2	80	80
SNB (°)	80 ± 2	81	81
ANB (°)	2 ± 2	1	1
Dental Analysis			
U1 – NA (mm)	4 ± 2	11	12
U1 - NA (°)	22 ± 2	35	36,5
L1 – NB (mm)	4 ± 2	10	9,5
L1 - NB (°)	25 ± 2	39,5	38
Interincisal (°)	135 ± 10	110	107
Facial Analysis			
E-line to upper lip(mm)	1 ± 2	3	3
E-line to lower lip(mm)	0 ± 2	2	2
Nasolabial (°)	102 ± 8	95	95

Archwires are applied in stages, starting with small NiTi wires, then increasing to larger wires and finishing with stainless steel wires for the stability of the final result. Cephalometric evaluation and panoramic root position assessment are needed to ensure that the treatment results are in accordance with orthodontic principles.[8] However, regardless of tooth movement, strong retention remains an important factor in all orthodontic cases to maintain the long- term stability of the results.[6]

Retention phase is an important aspect of orthodontic treatment, ensuring the stability of obtained results and preventing relapse. In this stage, fixed method and the removeable method can be used. Research indicates that fixed retainers provide better stability, but discomfort may occur on some patients.[10] Therefore, removable alternatives can be used considering patient cooperation and compliance during treatment. Additionally, given that the patient is a 30-year-adult, special care is needed in the retention phase, as bone remodelling is slower in adults compared to children or adolescents.[11]

Overall, this case reinforces the feasibility of non-extraction MBT system in the treatment of Class I dentoskeletal malocclusion. With proper planning, discrepancies in spacing can be corrected while achieving masticatory function and esthetics as well. However, retention should be emphasized considering the slower bone remodeling in this age group.

CONCLUSIONS

This case report demonstrates the successful management of dentoskeletal Class I malocclusion with single tooth crossbite and bimaxillary crowding using conventional MBT brackets system. After 17 months of treatment, occlusion and aesthetics were corrected and remained stable within normal occlusal parameters, emphasizing the importance of precise planning and retention.

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