

Class III camouflage treatment by distalization of mandibular dentition with buccal shelf screw - A Case Report.

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Abstract

Skeletal class III malocclusion is one of the most challenging situations to treat. In adult patients having prognathic mandible surgical mandibular set back or orthodontic camouflage are the treatment options. The use of bone screws like Buccal Shelf screw in the posterior area of the mandible is an effective approach for Class III camouflage treatment.

Class III correction is achieved by whole mandibular dentition distalization. Other camouflage treatment option is lower first premolar extraction but it lacks control over lower anterior torque.

Keywords: Buccal shelf bone screw, Orthodontic camouflage, Skeletal class III.

Introduction

A severe anteroposterior skeletal discrepancy in a patient with a Class III malocclusion is generally treated with orthognathic surgery. However, a mild to moderate skeletal Class III malocclusion can be treated by either surgery or camouflage.^{1,2} Traditionally, patients who were reluctant to undergo surgical procedures to improve their Class III dental relationships turned to camouflage orthodontic treatment with different extraction patterns according to the proclination of the mandibular incisors and the amount of negative overjet.³⁻⁵ Temporary anchorage devices (TADs), including miniplates, minis crews, and titanium screws, have been introduced to correct a Class III malocclusion by the distal en-masse retraction of the mandibular dentition in camouflage treatment.⁶⁻⁹ TADs are useful in

achieving effective mandibular molar distalization without requiring patient compliance and are highly accepted by adult patients. Consequently, several studies have quantified the amount of mandibular molar distalization and investigated the types, positions, and success rates associated with TADs.¹⁰⁻¹³ Studies have reported the achievement of 4 to 5 mm of mandibular molar distalization using minis crews in the retromolar area.^{14,15}

Case report

A 21 years old female patient came to the Department of Orthodontics & Dentofacial Orthopaedics with a chief complaint of forwardly placed lower jaw which she wanted to get corrected. Extraoral examination (Fig 1) revealed concave facial profile with a leptoprosopic facial type. Lips were competent with an inter-labial distance of 1mm. Face was apparently symmetrical with a prominent chin and reduced mento-labial sulcus. She had no pain or crepitus on temporo-mandibular joint examination. Upon further clinical examination, no deviation on opening and closing of mandible was observed.



Fig.1: Pre-treatment extraoral photos



Fig2: Pre-treatment intraoral photos.

Intra-oral examination (Fig 2) revealed the presence of all erupted permanent teeth except upper third molars. 11,12,21,22,15 is in cross bite. Crowded upper arch and mild lower anterior crowding. She also had Class III molar and canine relationship on both sides, with 2 mm of negative overjet and 3 mm of over bite was observed. The mandibular incisors were upright. The upper dental midline was coincided with the facial midline, with lower arch dental midline shifted towards left by 1.5mm to the upper arch dental midline. The arch forms were ovoid for both the maxilla and mandible. The gingiva appeared normal. The size and shape of tongue were normal too.

Diagnosis

A21-year-old female patient with Angle's class III malocclusion on class III skeletal bases, with average growth pattern and with anterior crossbite along with protrusive lower lip and concave profile.

Problem list

Skeletal problems

1. Class III skeletal base.

Dental problems:

1. 11,12,21,22,15 in crossbite
2. Reverse overjet of 2mm
3. Class III molar and canine relation
4. Crowded upper arch and mild crowding in lower anterior
5. Mandibular midline shifted 1.5mm to left.

Soft tissue problem:

1. Protrusive lower lip
2. Prominent chin

Treatment Objectives

1. To correct 11,12,21,22,15 cross bite
2. To establish class, I molar and canine relation bilaterally
3. To reduce lower lip protrusion

4. To correct the inclination and align the upper and lower anteriors in the basal bone
5. To improve the smile and aesthetics and overall appearance.

Treatment Plan

1. Patient was planned to be treated using fixed mechanotherapy using MBT 0.022 slot bracket.
2. After completion of initial levelling and alignment lower third molars to be extracted followed by retraction of whole mandibular dentition using buccal shelf screw (2X12mm).

Treatment Progress

Both arches were bonded including second molars and levelling and alignment was done with sequential nickel-titanium wires. After completion of levelling and alignment mandibular third molars were extracted followed by a miniscrew implant inserted in the mandibular buccal shelf region distal to the first molar on each side under local anaesthesia. A nickel-titanium coil spring was applied from the miniscrew to distalize the mandibular arch en masse with a continuous force of about 250 g on a 0.019x0.025-in stainless steel arch wire (Fig 3). Distalization was continued until the molars were in class I relation.



Fig 3: Mid-Treatment photographs

Result

Class I molar and canine relationships with normal overjet and overbite is achieved. Crowding is relieved,

and the dental midline discrepancy is corrected. Lower lip protrusion is reduced (Fig 4). Skeletal base relationship is improved and lower incisor inclination is kept upright (Fig 6 and Table 1). Overall, facial appearance is enhanced with an improvement in the nose-lip-chin relationship and maxillary incisor display on smiling.



Fig 4: Post Treatment photographs



Fig 5: Pre and post treatment OPG



Fig 6: Pre and post treatment cephalogram.

Cephalometric values	PRE	PRESENT
SNA(Degree)	78 ⁰	79 ⁰
SNB(Degree)	82 ⁰	81 ⁰
ANB(Degree)	-4 ⁰	-2 ⁰
WITS	-7mm	-4mm
UI-NA (angular)	31 ⁰	42 ⁰
UI-SN	111 ⁰	121 ⁰
IMPA(Degree)	90 ⁰	88 ⁰
NA per-pt. A	-5mm	-4mm
NA per-pog	-4mm	-3mm
FMA	26 ⁰	27 ⁰
LAFH	57mm	59 ⁰
Interincisal angle	124 ⁰	115 ⁰
Y-Axis	57 ⁰	59 ⁰
Nasolabial Angle	117 ⁰	102 ⁰

Table 1:

Discussion

Class III malocclusions are among the most challenging orthodontic cases to treat. While growth modification may be successfully attempted in children and adolescents, adults are usually treated with surgery or camouflage depending on the severity of the skeletal discrepancy. The external oblique ridge or buccal shelf of the mandible is a possible site for miniscrew placement due to its thick cortical bone and abundant mesiodistal space, which does not restrict tooth movement. It is also a safe area due to the absence of anatomic structures such as nerves, vessels, or dental roots. In this case, miniscrew anchorage from the external oblique ridge is successfully used to distalize the mandibular dentition for correction of anterior crossbite and establishment of normal overjet. Three measures have been taken into consideration. First, to keep lower incisors upright, lingual root torque is added in the arch wire. Second, to control the occlusal plane, suitable long crimpable hooks were used, screw height

is adjusted to same plane of arch wire. Third, to prevent lingual rolling of posterior teeth, wider arch wire was used.

Conclusion

Successful camouflage treatment of this adult patient with skeletal Class III malocclusion may be attributed to the use of absolute anchorage for distalization of the mandibular dentition. Orthognathic surgery may have achieved a better overall aesthetic result, but it would have involved greater cost and morbidity risk.

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