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# Management of Class II Division 1 Malocclusion with Bimaxillary Proclination of the Incisors - A Case Report

Ayenakin O, Utomi IL


## *Abstract*

***Background:*** This case reports the orthodontic management of a 23-year-old female who presented at the Lagos University Teaching Hospital with Angle's class II division 1 malocclusion on skeletal pattern II. This was complicated by increased overjet of 8.5mm, increased upper and lower incisal angles, mild upper anterior crowding of 2mm, constricted lower anterior arch, Ellis class I fracture of the upper right incisors, rotated teeth 21, 22, and 16, and the upper midline shift to the right by 1mm.

***Methods:*** Interdisciplinary management was done with Oral/Maxillofacial Surgery and restorative units where a 2-unit extraction of the maxillary first premolars and composite restoration of tooth 21 were done respectively. Comprehensive upper and lower fixed orthodontic appliance, preadjusted edgewise was used using Roth 0.022 prescription brackets.

***Results:*** The treatment was completed in 26 months and the outlined objectives were achieved.

***Conclusion:*** The objectives for the treatment were achieved and the patient had significant improvement in appearance. Fixed lingual of both arches and Hawley's were used for retention.


***Key words:*** Class II division I, Malocclusion, Interdisciplinary management, Orthodontics

**Authors' Affiliation**

Department of Child Dental Health, Lagos University Teaching Hospital, Idi Araba, Lagos.

**Correspondence**

Ayenakin O.

Department of Child Dental Health, Lagos University Teaching Hospital, Idi Araba, Lagos.

ORIGINAL ARTICLE

## Introduction

Malocclusion is the term used to describe any deviation of the teeth from the norm. Edward. H. Angle, classified malocclusion into I, II, and III, based on the relationship of the mesiobuccal cusp of the maxillary first molar to the buccal groove of the mandibular first molar[1]. Class II malocclusion is characterized by the mesiobuccal cusp of the maxillary first permanent molar occluding anteriorly to the buccal groove of the mandibular first molar. This type of malocclusion is the most common reason patients seek orthodontic treatment,[2] due to noticeable clinical features, particularly in Class II division 1 cases which is associated with proclination of the upper incisors. In Africa, Angles Class II malocclusion is the second most prevalent type accounting for 9.7%, while Class I and III malocclusions constitute 76.7% and 4% respectively.[3] Specifically, about 9.9% of Nigerians present with Angles Class II division 1 malocclusion[4] Bimaxillary proclination, characterized by proclined upper and lower incisors, further compromises the aesthetics when present in class II malocclusion. The management of Class II malocclusion depends on factors such as the patient's age, and the presence or absence of skeletal discrepancies[5].

The use of fixed appliances, with or without extractions in the management of Class II division 1 in adults has been documented in literature. Although 2-unit extraction of the upper first premolar is often recommended, management of Class II division 1 becomes more complex in the presence of equally proclined lower incisors.

### Clinical Case

Patient AO, a 21 years old female presented at the Orthodontic Unit of the Lagos University Teaching

Hospital, with a presenting complaint being "my upper teeth are forward". There was no significant medical history of note. On examination, there was no facial asymmetry, and her lips appeared competent, with a Jackson score of 3/1. The facial profile appeared slightly convex, a presentation that is common in skeletal Pattern II (Figure 1).

FRONTAL PROFILE VIEW FRONTAL SMILING

**Figure 1. Pretreatment extraoral photographs**

On intraoral examination, all the permanent teeth were present except tooth 38. There were no decayed, missing, or filled teeth. Mild upper anterior crowding of 2.5 mm was measured, and no crowding or spacing was seen in the lower arch. The upper and lower arches were slightly constricted, and the upper and lower incisors were proclined. The overjet was 8mm on the left and 6.5mm on the right, while the overbite was reduced and complete. There was a shift in the upper midline to the left by 1.5mm, mesiolabial rotation of 16, distolabial rotation of 21, 22, and Ellis class I fracture of 12. The anteroposterior molar relationships bilaterally were Angle Class II.

Upper arch Lower arch

Right buccal segment Left buccal segment

**Figure 2. Pretreatment intraoral photographs**

Panoramic radiograph (Figure 3) showed mesioangular impaction of 38 and 48, as well as otherwise healthy periodontium of all other teeth present (Figure 3). The pretreatment cephalometric analysis (figure 4) showed a reduced SNB of $78^0$ (relative to normal Nigerian values), ANB of $7.5^0$, and reduced interincisal angle of $83^0$. The Frankfort mandibular plane angle was increased ($22^0$) as well as the percentage lower facial height (62.5%), and the upper and lower incisal angles were significantly increased at $131^0$, and $125^0$ respectively. All the cephalometric soft tissue analysis parameters were within normal range.

**Figure 3. Pretreatment panoramic radiograph.**

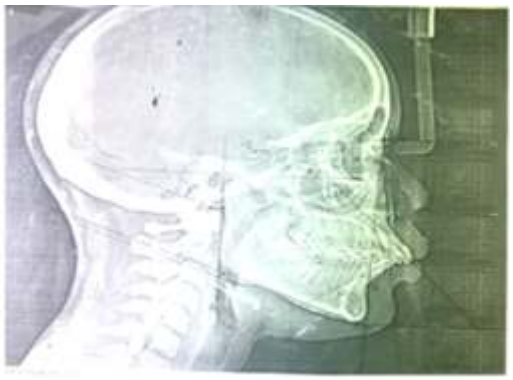

**Figure 4. Pretreatment Cephalometric radiograph.**

**Figure 5. Pretreatment study models.**

**Treatment Objectives.**

The objectives of the orthodontics treatment in this patient were to achieve normal overjet, full unit class II molar relationships bilaterally, to achieve Class I canine relationship, unravel the crowding, round up the arches, to derotate teeth, and achieve coincident midlines.

**Treatment Plan.**

The treatment plan was to set up a comprehensive fixed orthodontic appliance therapy, preadjusted edgewise, with 2-unit extractions of 14 and 24, to band up to the 7s, and interproximal reduction in the lower arch to create space to upright the lower incisors, and to consider the extraction of the

impacted lower 8s. Hawley's retainer and fixed lingual retainers would be provided after orthodontic treatment.

**Treatment Progress.**

Two unit extraction of the upper 14 and 24, as well as the composite build-up of 12, was done prior to orthodontic treatment. This was followed by a complete upper and lower arch set-up, using the Roth 0.022 prescription, preadjusted edgewise bracket system. The arch wire sequence used was '0.012 Nickel Titanium wires (Niti) in the upper and lower arches, followed by 0.014 Niti, and 0.016 Niti. Elastic separators were placed around all 7s to create space for banding of the 7s, after which the wire sequence continued as 0.018 Niti, and 0.020 Niti. Minimal interproximal reduction was done repeatedly in the lower arch intermittently and the wire sequence proceeded up to rectangular 0.019' x 0.025' stainless steel wires (SSW). Crimpable hooks were placed in the upper arch of this rectangular wire, for the application of active tie-back for space closure and class II elastics. Figure of 8 wiring was applied from upper 13 to 23 to retract the upper anterior segment and close the extraction spaces, using the active tie-back (ATB) bilaterally in the upper arch. Upper midline correction was done using 2 elastic modules ATB on the upper right quadrant, and single module ATB on the left quadrant. Medium Class II elastics were given to encourage further retraction of the upper segment and correct the Class 1 canine relationship. A passive tie-back on the upper left quadrant was placed to stabilize the arch after space closure on the left side, while an active tie-back continued on the right. Elastic chain was applied from 17 to 27 to close the residual spaces. Figure of 8 wiring with soft stainless-steel wire was then applied to all the teeth in the upper arch, while posterior box elastics were given for posterior detailing. The patient was debonded after 26 months. The composite build-up of 12 was repeated after debonding, while upper Hawley and lower fixed retainers were given.

**Figure 6. Intraoperative photographs.**

**Figure 7. Intraoperative photographs showing before and after space closure.**

**Frontal 1** **Frontal 2** **3/4 view** **Profile**

**Figure 8. Post-treatment extraoral photographs.**

**Figure 9. Post-treatment intraoral photographs and retainers.**

**Figure 10. Post-treatment Cephalometric radiograph.**

**Figure 11. Before and after treatment.**

**Figure 12. Post-treatment study models.**

**Table 1. Comparison of pre- and p0st- treatment cephalometric values**

| | Pre-treatment values | Post-treatment values | Difference |
|---|---|---|---|
| • SNA | $85.5^0$ | $85.5^0$ | 0 |
| • SNB | $78^0$ | $78^0$ | 0 |
| • ANB | $7.5^0$ | $7.5^0$ | 0 |
| • U1 to FP | $131^0$ | $118^0$ | $13^0$ |
| • LI to MP | $125^0$ | $110^0$ | $15^0$ |
| • IIA | $83^0$ | $107.5^0$ | $24.5^0$ |
| • FMA | $22^0$ | $20^0$ | $2^0$ |
| • LFH | 62.5% | 60% | 2.5% |

**Treatment results.**

Normal overjet of 2mm was achieved, upright upper incisors, significantly improved proclined lower incisors, rounder arches, restoration of 12, coincident midlines, and the smile and profile remain balanced.

## Discussion

The patient in this case was managed following Roth's philosophy of extracting two maxillary first premolars in class II cases where there is no crowding or skeletal deficiency[6,7]. Although the mandible was slightly deficient and the SNA angle was at the upper limit of normal, orthognathic surgery was not an option based on the patient's preference, hence a definitive management with dental camouflage was prescribed. Post-treatment satisfaction with orthodontic camouflage without surgery is similar to satisfaction following orthognathic surgery[8].

Space management was of utmost importance due to the significantly increased upper and lower incisal angles, hence anchorage was controlled by ensuring all the second molars were banded to provide better reinforcement when retracting the proclined upper and lower incisors. Most of the post-treatment cephalometric parameters improved significantly. Although the lower incisors to mandibular plane angle was still increased, the post-treatment occlusal features were very acceptable considering the severity of the bimaxillary proclination and the fact that no teeth were extracted in the lower arch.

## Conclusion

Angle's class II division 1 malocclusion can be successfully managed with extractions and the use of elastics. In managing patients with bimaxillary proclination, good stability after treatment can be ensured by normalizing the interincisal angle, achieving lip competence, and having good buccal intercuspation.

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