

Case Report

# Nonsurgical Management of Skeletal Class III Malocclusion with Anterior Open Bite Using a Customized Angel Aligner Pro Protocol: A Case Report

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## Abstract

**Background:** Skeletal Class III malocclusions with anterior open bite are considered among the most difficult orthodontic challenges in adult patients. They are frequently associated with functional limitations, compromised smile esthetics and reduced quality of life. Orthognathic surgery has traditionally been the treatment of choice, whereas orthodontic camouflage with fixed appliances, extractions or skeletal anchorage has been reserved for mild to moderate cases. However, many patients decline surgical approaches due to their invasiveness, risks and costs. Clear aligner therapy has recently emerged as a less invasive alternative, with documented advantages in vertical control, sagittal correction and patient acceptance.

**Methods and Findings:** A 34-year-old Caucasian female presented with skeletal, dental and dentoalveolar Class III malocclusion characterized by anterior crossbite and anterior open bite. The patient declined surgical correction and was treated using a customized Angel Aligner Pro protocol. A 4×4 staging sequence was implemented, with 4 days per aligner and 8 days per stage, for a total active treatment time of 30 weeks. Biomechanical strategies included:

- A high posterior trim line to maximize retention and anchorage
- A specific attachment design to promote controlled extrusion of anterior teeth and sagittal correction of the lower incisors
- An accelerated staging protocol designed to maintain biological predictability while enhancing treatment efficiency

The patient showed excellent compliance. At the end of treatment, all six Andrews' keys of occlusion were satisfied, with a positive overjet of 2 mm, overbite of 2 mm and bilateral Class I molar and canine relationships. Smile esthetics and incisor display were significantly improved and no refinements were required. The treatment was completed without adverse effects in less

than eight months.

**Conclusion:** This case demonstrates that customized clear aligner biomechanics can effectively manage skeletal Class III malocclusion with anterior open bite in adult patients who decline surgery. The combination of high-trim line mechanics, customized attachments and accelerated aligner staging allowed for a predictable and efficient correction within a short timeframe. These results reinforce the role of aligner therapy not only for mild camouflage but also for more complex Class III scenarios requiring vertical control and precise anterior guidance.

**Keywords:** Skeletal Class III; Aligner Therapy; Orthognathic Surgery

## Abbreviations

OB: Overbite; OJ: Overjet

## Introduction

Skeletal Class III malocclusions with anterior open bite are among the most complex orthodontic problems in adults. Conventional treatment often involves orthognathic surgery, which many patients refuse. Clear aligners offer a minimally invasive, esthetic and biomechanically efficient option. This report presents the successful nonsurgical management of a skeletal and dentoalveolar Class III case with anterior open bite using a customized Angel Aligner Pro protocol [1].

## Ethical Statement

The project did not meet the definition of human subject research under the purview of the IRB according to federal regulations and therefore, was exempt.

## Methods

A 34-year-old Caucasian female presented with skeletal, dental and dentoalveolar Class III malocclusion, anterior crossbite and anterior open bite. The treatment plan involved a customized Angel Aligner Pro protocol with a 4×4 sequence (4 days per aligner, 8 days per stage), for a total treatment duration of 30 weeks [2]. The biomechanical strategy was designed to maximize efficiency and predictability, including:

- High posterior trim line, enhancing aligner retention and providing superior vertical control
- Customized attachment protocol, specifically:
  - Horizontal attachments placed on the palatal incisal edge of the maxillary incisors, to optimize anterior extrusion and torque control
  - Rectangular vertical attachments on canines and premolars, improving anchorage and ensuring effective sagittal and vertical control
- Interproximal Reduction (IPR) of 0.4 mm from mandibular canine to canine (3-3), to relieve crowding and facilitate dentoalveolar compensation
- Aligners with integrated “powerchain effect” in the finishing phase of the mandibular arch, designed to optimize space closure and alignment consolidation
- Accelerated staging protocol, allowing controlled movements within a biologically safe range while increasing overall efficiency

The patient was highly compliant, wearing aligners as instructed and attending scheduled follow-ups. No auxiliary appliances were required throughout the treatment.

## Results

Treatment achieved the following results [3,4]:

- Overjet: 2 mm
- Overbite: 2 mm
- Bilateral Class I molar and canine relationship
- Six Andrews’ keys of occlusion satisfied
- Improved smile esthetics with balanced incisor display

The total treatment duration was 30 weeks, with no need for refinements (Fig. 1-12).



**Figure 1:** Extra-oral pictures.



**Figure 2:** Intra-oral pictures.

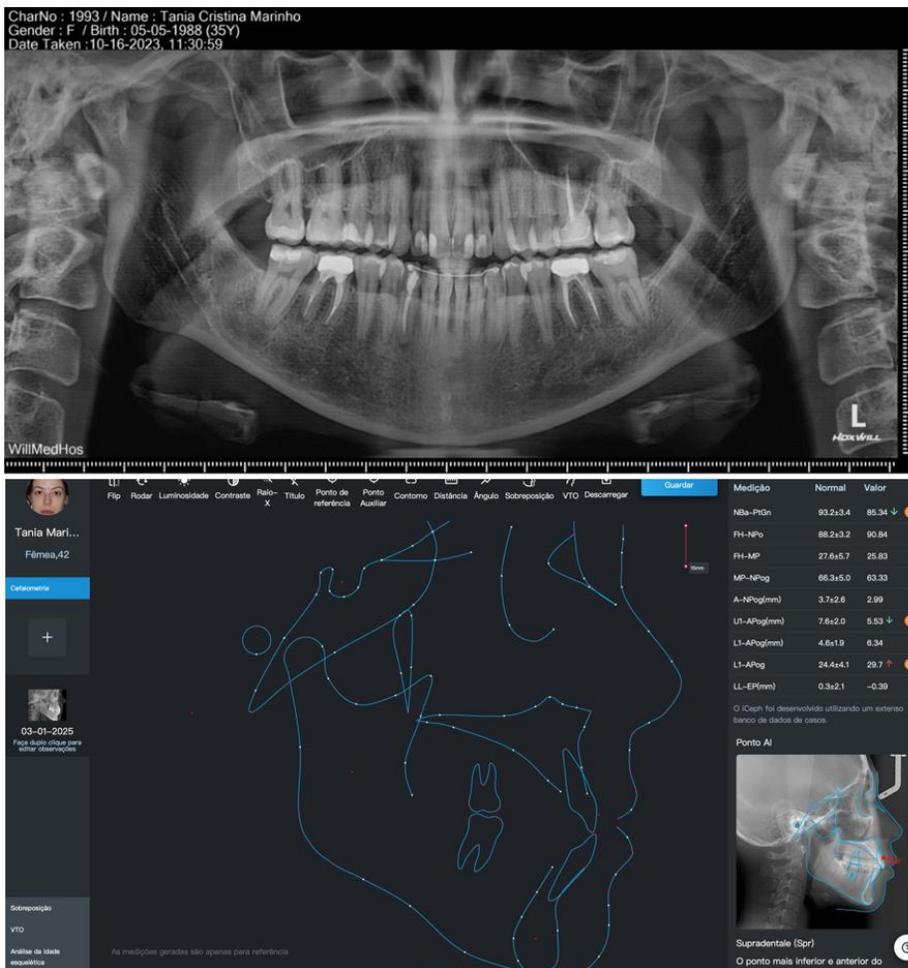


Figure 3: X-ray pictures.



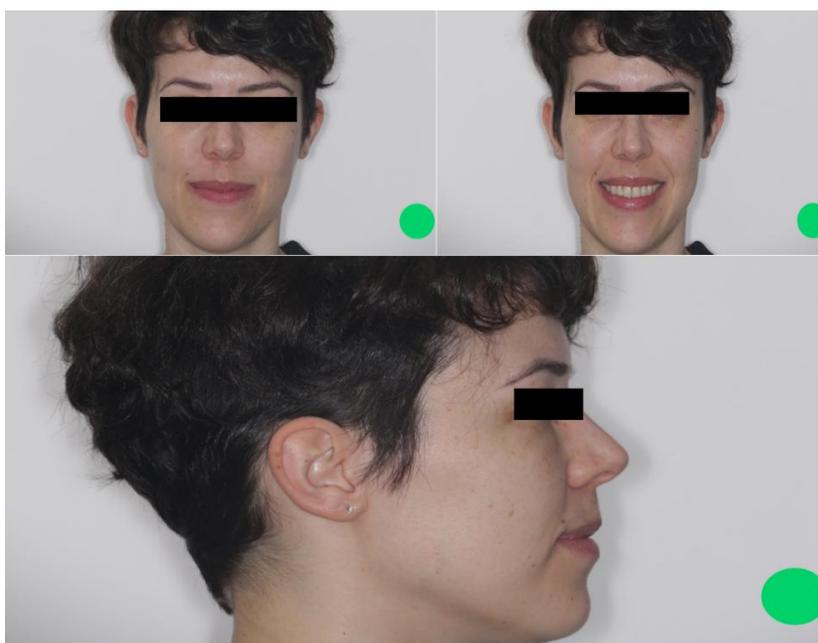
Figure 4: Extra-oral pictures.



**Figure 5:** Intra-oral pictures.



**Figure 6:** 6 months after retention (Intra-oral).



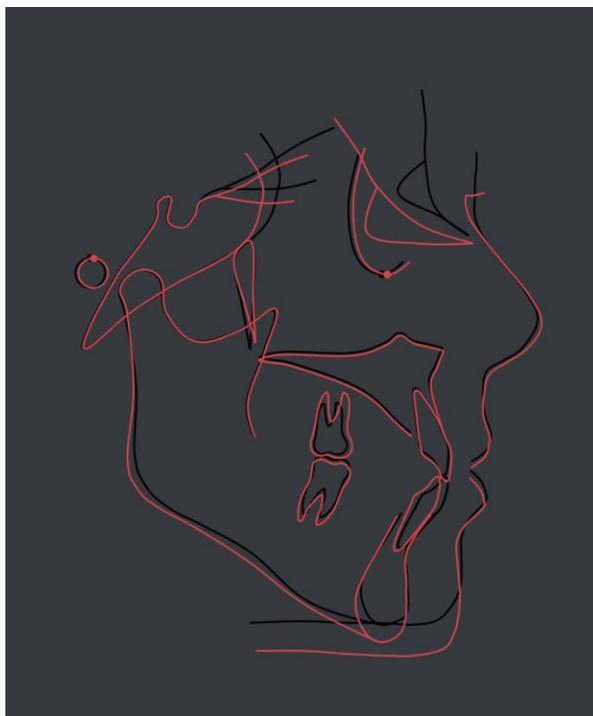
**Figure 7:** 6 months after retention (Extra-oral).



**Figure 8:** 12 months after retention (Extra-oral).



**Figure 9:** Pretreatment extraoral and intraoral photographs.



**Figure 10:** Pretreatment radiographs and cephalometric tracing.



**Figure 11:** Post-treatment extraoral and intraoral photographs.



**Figure 12:** Superimposition of pre- and post-treatment cephalometric tracings.

## Discussion

This case illustrates that skeletal Class III malocclusions with anterior open bite can be managed effectively with clear aligners in selected adult patients. Compared to fixed appliances, aligners provide superior vertical control by minimizing posterior extrusion. The use of a high-trim line and customized attachments optimized biomechanics, allowing correction within a short timeframe. These findings support growing evidence that clear aligners are a viable alternative for nonsurgical Class III camouflage.

## Conclusion

Clear aligner therapy using Angel Aligner Pro, with a high-trim line and customized attachments, achieved predictable and efficient correction of skeletal Class III with anterior open bite in an adult patient. This nonsurgical approach provided functional and esthetic results in only 30 weeks.

## Conflict of Interest

The author declares a role as Key Opinion Leader and Clinical Board Member for Angel Aligner. The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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## Author's Contribution

Author read and approved the final manuscript.

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