

# Orthodontic treatment from childhood to adolescence with minimally invasive therapy: correction of atypical swallowing and dental alignment. A case report

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## Abstract

**This case report describes a minimally invasive orthodontic approach for a patient who was identified in childhood and followed through adolescence. The approach was intended to correct atypical swallowing, diastemas, and overjet. The treatment used two devices: the Froggy Mouth for myofunctional therapy and clear aligners for dental alignment and overjet correction.**

**Keywords:** Case report, Aligner, Atypical swallowing, Myofunctional approach, Combined treatment, Froggy mouth, Dentistry, Orthodontics.

## Introduction

Atypical swallowing is a common disorder in pediatric patients and can negatively affect craniofacial growth and dental development. In many cases, this disorder is accompanied by orthodontic problems such as diastemas, overjet, and altered skeletal relationships in the transverse or anteroposterior dimensions. Traditionally, these problems require complex orthodontic treatment. However, integrating myofunctional therapy with clear orthodontic appliances offers a minimally invasive and equally effective solution (1). This case report illustrates the clinical case of a 7-year-old pediatric patient with atypical swallowing, interdental diastemas, and a pronounced overjet (Figure 1). Additionally, at the first visit, the patient exhibited an incorrect tongue posture with marked contact of the anterior tongue tip against the upper incisors during swallowing (2). The patient presented Class I malocclusion and labial incompetence.

Given the impossibility of performing a preliminary radiographic analysis (parents deny taking x-ray examinations such as orthopantomography and cephalometry), the clinical study was based on observation and carefully analyzing the soft tissues according to Ricketts' method (Figure 2).

Based on Ricketts' E-line (3), photographic analysis of the patient's profile suggests that both lips are positioned anterior to this line, with the upper lip approximately 3 mm and the lower lip 5 mm ahead. Usually, the upper lip should be placed 2 - 4 mm behind the E-line while the lower lip should be 0 - 2 mm behind it. The advanced position of the lips could indicate dental protrusion, but it may also suggest a tendency towards a Class III skeletal pattern where the mandible is more advanced with respect to the maxilla (4). The protrusion of the lower lip beyond the E-line may be particularly indicative of a Class III tendency. However, a definitive diagnosis cannot be made without further examinations, such as an X-ray lateral cephalometric analysis.

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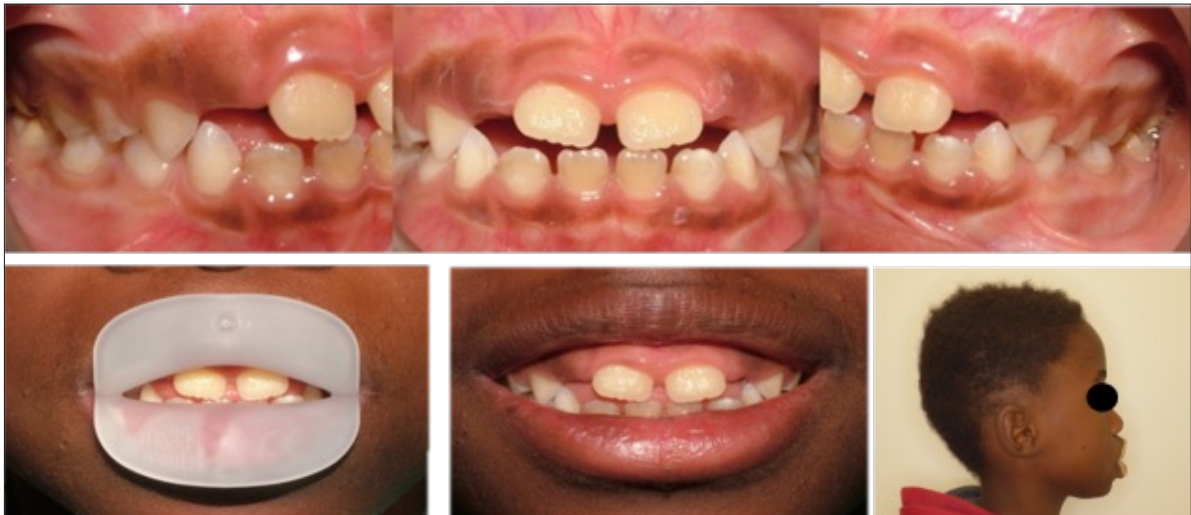


Figure 1. Pre-treatment conditions

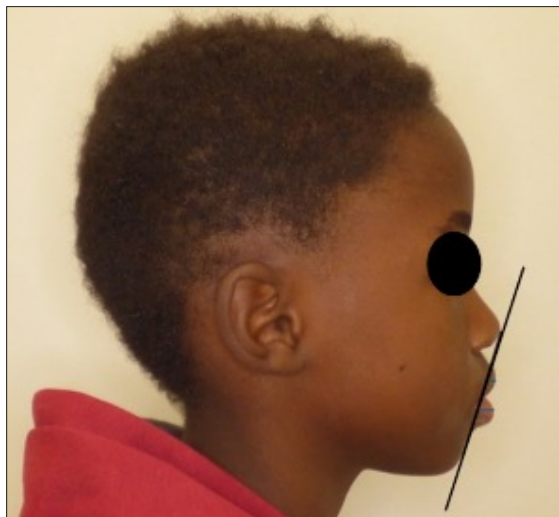


Figure 2. Profile photograph of the patient with Ricketts E line tracing.

### Materials and methods

The patient was followed at the Orthodontics Division of the U.O.C of Dentistry at Fatebenefratelli San Pietro Hospital in Rome. The treatment began with the Froggy Mouth myofunctional device designed to rehabilitate the orofacial musculature and correct the improper habits associated with atypical swallowing to achieve proper tongue posture and function (5). The patient was instructed to use the Froggy Mouth according to protocol, which involved wearing it for 15 minutes daily during activities such as watching television or playing video games (with the chin and neck forming a 90° angle). After three months of myofunctional therapy, this device allowed correct tongue positioning and strengthened the orbicular muscles, making them more toned. During the myofunctional therapy alone, without concurrent orthodontic treatment, it was also possible to observe a change in interdental spaces due to the progressive absence of tongue pressure on the dental elements (Figs. 3, 4).



Figure 3. Results after miofunctional therapy at 3 months (A), 6 months (B), and 9 months (C)



Figure 4. Before and after Froggy Mouth myofunctional therapy

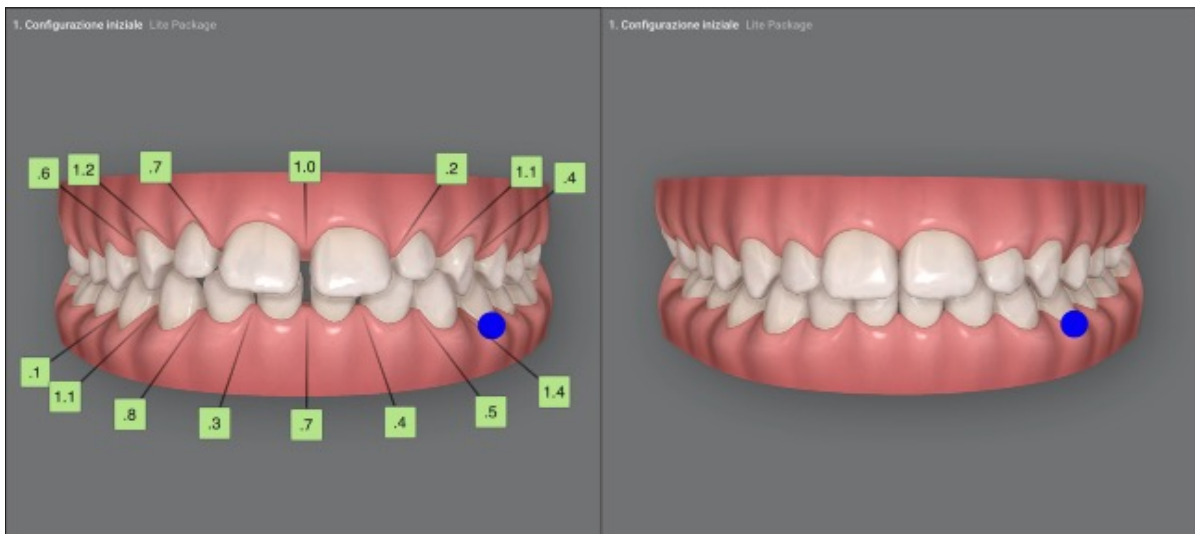


Figure 5. Planning and situation at the beginning of therapy with transparent aligners

At the age of 12, the treatment progressed to a second phase using clear aligners specifically designed to align the teeth, close interdental spaces, and correct the overjet. The treatment plan involved a series of 14 aligners to be changed every two weeks (Figure 5).

### Results

After only three months of myofunctional therapy with the Froggy Mouth, a significant improvement in the patient's tongue posture was observed, with a reduction in anterior tongue thrust. Swallowing function improved, and the orofacial musculature showed increased tone and coordination. Clear aligners show the teeth alignment and the gradual closure of interdental spaces. After approximately six months of treatment, the bite was corrected, the overjet was reduced, and all diastemas were closed, resulting in perfect intercuspation and correction of the anterior bite. Additionally, an analysis using Ricketts' E-line demonstrated a marked improvement in the relationship between the soft tissues (Figure 6).

Analyzing the patient's soft tissues in the initial phase

and post-treatment, changes in the position of the lips relative to the Ricketts E-line can be observed. Initially, the patient's lips are positioned anteriorly to the Ricketts E-line. This indicates dental protrusion and a relationship between the lips and teeth that falls outside normal parameters, suggesting a possible discrepancy in the relationship between the dental arches and the anteroposterior position of the anterior teeth. After combined treatment (myofunctional therapy first followed by orthodontic treatment), the lips appear to be more retracted, closer to the Ricketts E-line. This suggests that the orthodontic treatment improved dental alignment and the position of the arches, bringing the lips into a more balanced position relative to the normal parameters of the Ricketts E-line.

The orthodontic treatment has had a positive effect on the relationship between the anterior teeth and the position of the lips, improving facial aesthetics and aligning the patient's profile closer to the ideal, according to Ricketts' analysis. Additionally, a correct relationship between the opposing arches has been achieved at the dental level with the closure of pre-existing diastemas (Figure 7).





**Figure 6.** Ricketts E line before and after orthodontic treatment.



**Figure 7.** Fine result treatment, oral and extra-oral photos

## Discussion

The integration of myofunctional therapy with invisible orthodontic treatment allowed for optimal results in a relatively short period with minimal invasiveness and straightforward therapeutic management. The correction of atypical swallowing contributed not only to improving swallowing function but also to stabilizing the orthodontic treatment, reducing the relapse risk (6-8). This case demonstrates the effectiveness of an interdisciplinary and minimally invasive approach in treating complex orthodontic problems. Using Froggy Mouth as preparatory therapy facilitated the subsequent treatment with aligners, leading to a harmonious aesthetic and functional outcome that is remarkably stable over time. The patient wears retention aligners for eight hours a day.

## Conclusions

This case report highlights how a minimally invasive approach, combining myofunctional therapy and invisible orthodontics, can lead to excellent results in children and adolescents with atypical swallowing and malocclusion problems. The synergy between Froggy Mouth and aligners resulted in significantly correcting overjet and stable dental alignment, improving the patient's oral function and aesthetics without the need for more invasive interventions.

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