

# The fallacy of tongue thrust and non-surgical treatment of a severe anterior open bite

## Abstract

**Introduction:** The causal relation between tongue thrust swallowing or habit and development of anterior open bite continues to be made in clinical orthodontics yet studies suggest a lack of evidence to support a cause and effect. Treatment continues to be directed towards closing the anterior open bite frequently with surgical intervention to reposition the maxilla and mandible. This case report illustrates a highly successful non-surgical orthodontic treatment without extractions.

**Case report:** After seeking treatment options since the age of 12 and undergoing several unsuccessful attempts to close her anterior open bite, the patient who is a dentist presents at the age of 33 and successfully completes non-extraction orthodontic treatment in 15 months. Post treatment results show a dramatic closure of the anterior open bite and proper intercuspation of teeth with a proper over jet and overbite relation. A stable occlusion without an anterior overbite relapse is maintained at a two-year recall visit.

**Conclusion:** Tongue thrust swallowing as a cause of an anterior open bite appears more a fallacy than a direct cause. This case report illustrates the potential of non-extraction orthodontic therapy with a system of braces that utilizes light forces and moves the tooth roots toward their final position from the onset of treatment in a short of amount of time from weeks to months.

**Keywords:** anterior open bite, tongue thrust, non-extraction orthodontic treatment

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## Introduction

The anterior open bite remains one of the most challenging cases to treat in orthodontics. It is characterized by a negative overbite or lack of a proper overbite relation of maxillary and mandibular incisors with posterior teeth in occlusion. The prevalence of an anterior open bite varies with age and among ethnic groups and ranges from 1 to 11.5%.<sup>1-3</sup> The etiology of open bite remains uncertain<sup>4,5</sup> with numerous theories of development that include tongue function, digital habits, heredity and unfavorable patterns of growth.<sup>6</sup> In addition, some studies suggest a correlation between a weakened musculature and a long face anterior bite pattern.<sup>7</sup> One of the most debated theories of open bite development particularly in the classic literature and with a reported wide variation in prevalence is tongue thrust swallowing.<sup>8-10</sup> Tongue thrust is considered a normal physiological manifestation of suckling and also occurs in transitional dentition but typically disappears with the establishment of a normal anterior overbite.<sup>10</sup> The tongue thrust diagnosis is still prevalent and treatment is directed towards closure of the associated anterior open bite frequently with surgical intervention to reposition the maxilla and mandible with adjunctive treatment involving tongue reeducation.<sup>11,12</sup> Other treatment modalities include the use of micro implant anchorage complemented by genioplasty along with multiple jaw surgeries with dental implants for cases with missing teeth.<sup>13,14</sup> Classic non-surgical interventions which include extraction therapy or multi-brackets with fixed habit correcting appliances and high-pull therapy often result in marginal skeletal and occlusal improvements.<sup>15-18</sup> Advances in mechano therapy, orthodontic diagnosis and treatment concepts have nearly eliminated the need for

surgical intervention and multiple tooth extractions for correction of an anterior open bite. Viazis et. al.<sup>19</sup> has proposed new diagnostic terms of orthodontosis and orthodontitis as a replacement to the widely used, arbitrary and scientifically unverified Angle classifications of I, II and III. The central paradigm of these new diagnostic terms is based on the theory that malpositioned teeth and the clinical manifestation of an anterior open bite represent unfinished tooth eruption. This system of braces known as Fastbraces® simplifies the diagnostic and treatment process significantly. The treatment is based on the non-extraction mechanically aided continuation of eruption by mimicking the lighter natural forces of tooth eruption. The following case report illustrates the successful long term treatment outcome of a severe anterior open bite and challenges the diagnosis of tongue thrust as its cause.

## Case report

The patient is a 33-year old female dentist who presents to the treating co-author's private practice in Athens, Greece with a chief complaint of an open bite and poor posterior occlusion (Figure 1). As a 12-year old child growing up in Serbia, the patient accompanied by her parents first presented to the private family dentist for evaluation and treatment. She was diagnosed with a skeletal open bite secondary to a "tongue thrust problem" which her dentist described as continuous suckling. She was given a series of removable habit correcting appliances which she used as instructed but tapered herself off in about a year because treatment was ineffective. Several years passed before the patient returned to a public dentist (state run health and dental care) for treatment at the age of 19 where she was given removable orthodontic/orthopedic appliances followed by application of brackets

prior to surgical orthodontic treatment. Once again her anterior open bite was attributed to tongue thrust. Because of the uncertain outcome and difficulty associated with the surgical orthodontic procedure as described by her dentist and surgeon she decided not to pursue treatment and brackets were removed. Shortly thereafter she started dental school where she was seen by a professor in the department of orthodontics. She was told that surgical orthodontics was the only viable treatment option but was once again cautioned of the difficulty and uncertain outcome of the procedure. She once again decided to forgo surgery and all orthodontic treatment for several years.



Figure 1(A) Pre-treatment facial and intra-oral frontal view photographs.



Figure 1(B) Pre-treatment intra-oral occlusal view photographs.

### Treatment objective

On examination the patient has a mesoprosopic face with an anterior open bite of 8 mm with end to end occlusal contacts of first molars and stable second molar occlusion. After review of pretreatment panoramic and lateral cephalogram radiographs the patient was treatment planned for non-surgical, non-extraction orthodontic treatment to eliminate the anterior open bite and correct associated malocclusion by utilizing the bracket system, Fastbraces® (Figure 2).



Figure 2 Pre-treatment lateral cephalogram and panoramic radiographs.

### Treatment progress

Treatment took 15 months with appointments scheduled approximately on a monthly basis. Brackets were initially placed on

the four maxillary incisors for patient comfort for one month. At the second appointment brackets were placed on all remaining maxillary teeth including the properly occluding second molars. This set up provided appropriate force and adequate torque for both the maxillary first molars and all premolar roots to upright and aligns the maxillary arch by inducing alveolar bone growth in order to provide proper occlusion with opposing mandibular teeth. At the third visit and three months into treatment, brackets were placed on the mandibular teeth with elastics to close the anterior bite. The treating co-author notes that treatment time could have been substantially less had the patient diligently complied with the use of elastics.

### Treatment results

Clinical results along with photographs and radiographs comparing pre and post treatment show dramatic closure of the anterior open bite, a stable occlusion with alignment of roots in a treatment time of 15 months (Figure 3) & (Figure 4). Overjet and overbite was measured at 2 mm and normal intercuspation of teeth was achieved. At a two-year follow-up visit the patient maintained stable occlusion, proper overjet/overbite relation without relapse of an open bite (Figure 5).



Figure 3A Post-treatment facial and intra-oral frontal view photographs.



Figure 3B Post-treatment intra-oral occlusal view photographs.

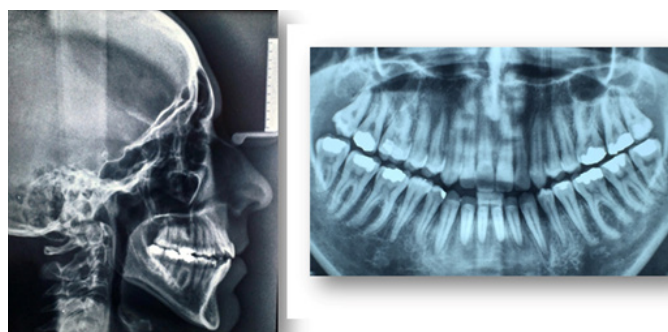


Figure 4 Post-treatment lateral cephalogram and panoramic radiographs.



**Figure 5** Two-year post-treatment follow-up, intra-oral frontal view.

## Discussion

Tongue thrust swallowing and development of an anterior open bite have been and continue to be associated yet the relationship between the two remains unclear. There is evidence to suggest that an anterior tongue position may prevent anterior teeth eruption but that tongue thrust swallowing is an adaptive mechanism to an open bite in order to maintain an anterior seal rather than it's cause.<sup>10,20</sup> The main treatment objective with this clinical presentation should be to close the anterior open bite thereby correcting the functional tongue thrust. There are limitations with traditional orthodontic systems which greatly influence treatment planning towards a combination of mechanotherapy and surgical orthodontics for a severe anterior open bite. Many patients wish to forgo the risks and possible complications of surgical treatment and opt for a non surgical solution which is more difficult especially for long term stability and retention.<sup>20</sup> Most often traditional orthodontic therapy in these cases will require dental extractions and high-pull headgear to aid in bite closure<sup>17–19</sup> and intrusion of maxillary molars, respectively.<sup>21</sup> Complicating matters is the adherence to Angle's arbitrary diagnostic classifications of Class I, II and III which compels the clinician to change mandibular position and functional occlusion in order to achieve a morphologic occlusion that conforms to the arbitrary ideal of Class I.<sup>22–23</sup> In 2014, Viazis et al.<sup>19</sup> introduced biologically based orthodontic diagnostic terms after a multi year observational study of completed cases with an overwhelming majority treated non-extraction. Orthodontosis is defined as the non-inflammatory deficiency of alveolar bone in the horizontal dimension caused by the displaced root(s) of the tooth, typically palatally or lingually. Orthodontitis is defined as associated excess soft tissue manifestation and chronic manifestation. In effect the hard tissue bony hypoplasia (Orthodontosis) and soft tissue manifestation (Orthodontitis) associated with malpositioned roots represent unfinished eruption. The utilization of the orthodontic system, Fastbraces® is designed to decrease orthodontic forces by increasing wire flexibility and simultaneously moving the roots towards their final position from the beginning of treatment by allowing immediate torque from the onset.<sup>19</sup> This new technology of orthodontic tooth movement contemplates that light forces possibility stimulate bone remodeling around displaced roots therefore eliminating the need for extraction therapy.

## Conclusion

Tongue thrust swallowing as a cause of an anterior open bite appears more a fallacy. The authors believe that an anterior open bite represents unfinished tooth eruption rather than a consequence of tongue thrust swallowing. This case report illustrates the potential of non-extraction orthodontic therapy with a system of braces that utilizes light forces thereby facilitating the continuation of eruption

while inducing alveolar bone remodeling and development in shorter treatment times.

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## Conflicts of interest

The author declares there are no conflicts of interest.

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