Severe Anterior Open Bite during Mixed Dentition Treated with Palatal Spurs

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Deleterious oral habits, such as non-nutritive sucking or tongue thrusting, if not intercepted at an early stage can cause complex malocclusions. This manuscript describes a clinical case report of a successful interception of a severe anterior dental open bite caused by thumb sucking and tongue thrusting habits. The case involved a six-year-old female patient treated with the use of palatal spurs and maxillary removable crib followed by monitoring the development of dental occlusion. At the end of the interceptive phase acceptable results were achieved, showing the efficacy of the treatment undertaken as well the importance of an early intervention to remove harmful oral habits.

Key Words: Finger sucking, open bite, interceptive orthodontics.

INTRODUCTION

Sucking habits and associated occlusal anomalies have been well studied in the literature. Although these habits do not pose a problem from an orthodontic standpoint during early childhood if they persist throughout the period of transitional and permanent dentition, serious malocclusion may develop characterized by anterior open bite with upper incisor protrusion, lower incisor retroclination and posterior crossbite.[1,2] The presence of an anterior open bite may facilitate the development of other harmful habits such as tongue and lip thrusting.[2]

Although deleterious oral habits are etiological factors of malocclusion, it should be pointed out that the severity of the latter will be directly related to the classical, so-called "Graber's triad" regarding the duration, frequency and intensity with which the habits are performed as well as individual predisposition relative to facial growth pattern.[1,2]

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The cessation of harmful habits and the re-establishment of normal occlusion are among the key roles played by interceptive orthodontics. For instance, anterior open bite tends to self-correct when the habit is dropped.[3,4] Conversely, if not intercepted early, non-nutritive sucking habits can render relatively simple malocclusion treatment extremely complex.[3-5]

The literature describes different approaches to intercept finger sucking and tongue thrusting habits as well as correcting anterior open bite.[7-11] Noteworthy among these are the use of palatal or lingual spurs and palatal crib. These two treatment options have yielded satisfactory results in some cases as they can interfere with the habits while fostering tongue posture reeducation.[11]

This article aims to describe a successful clinical case involving the interception of a severe anterior dental open bite caused by finger sucking and tongue thrusting in a patient in the initial transitional dentition.

Clinical Case

A six-year-old female with no notable medical history presented to our orthodontic department with the chief complaint, as reported by her mother that she "desires to bring the anterior teeth together".

The patient reported a non-nutritive thumb sucking habit and during the clinical examination she was also found to have the habit of tongue thrusting at rest and during swallowing.

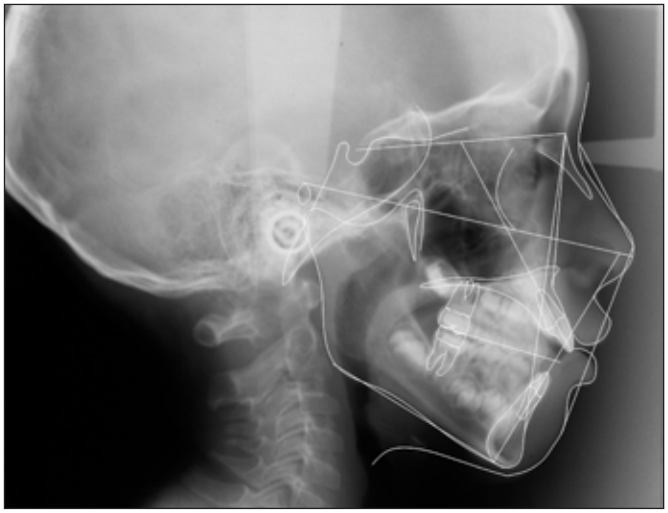
The intraoral examination showed that the patient was in the initial phase of the transitional dentition with a Class I molar relationship, anterior 9 mm open bite and 6 mm overjet. She also had unerupted maxillary lateral incisors (Figure 1).

An analysis of the panoramic radiograph indicated the presence of all permanent teeth except the third molars (Figure 2). Cephalometrically, according to the analysis of Steiner, the sagittal and vertical skeletal patterns were within normal limits while deviations were restricted to incisors positioning (Figure 3 and Table 1).

Figure 1: Initial intraoral photos

Figure 2: Initial panoramic radiograph

Figure 3: Initial Cephalogram



Interceptive orthodontic treatment was planned to promote the cessation of the finger sucking and tongue thrusting habits, leading teeth to re-establish normal eruption.

After discussing the advantages and disadvantages of this treatment with the parents, fixed palatal arch with anterior spurs was placed in the maxillary arch which was used for ten months, long enough to thumb-sucking habit cessation (Figure 4). However, the tongue thrusting persisted and, thus a maxillary removable palatal crib was installed (Figure 5). Over the course of seven months, this approach resulted in gradual improvement of anterior dental relationship. At that point, the patient lost the appliance and another was fabricated and used for another 6 months. After another five months, favorable results were achieved and routine follow up was scheduled until the patient reached full permanent dentition. Total treatment time of the interceptive phase was 23 months.

TABLE I

Steiner Analysis	Initial	Final	Norm
SNA	80.8	81	82
SNB	77.7	78.7	80
ANB	3.1	2.3	2
U1 - NA (mm)	10	10.4	4.3
U1 - NA (°)	32.5	31.8	22.8
L1 - NB (mm)	6.1	5.1	4
L1 - NB (°)	23.4	25.3	25.3
Interincisal Angle	121.1	118	130
Pog - NB (mm)	0.2	1	2.4
SN - GoGn	32.8	32.6	32.9

A 3 years follow-up, at 11 years-old patient showed adequate alignment and leveling of the arches, overbite and overjet within normal standards and a Class I molar relationship demonstrating the stability of the treatment undertaken (Figures 6 and 7). Cephalometric evaluation showed maintenance of the skeletal characteristics and improvement of dental measurements (Figure 8 and Table 1).

Figure 4: Fixed palatal arch with anterior spurs

Figure 5: Maxillary removable palatal crib

Figure 6: Final intraoral photos

Figure 7: Final panoramic radiograph

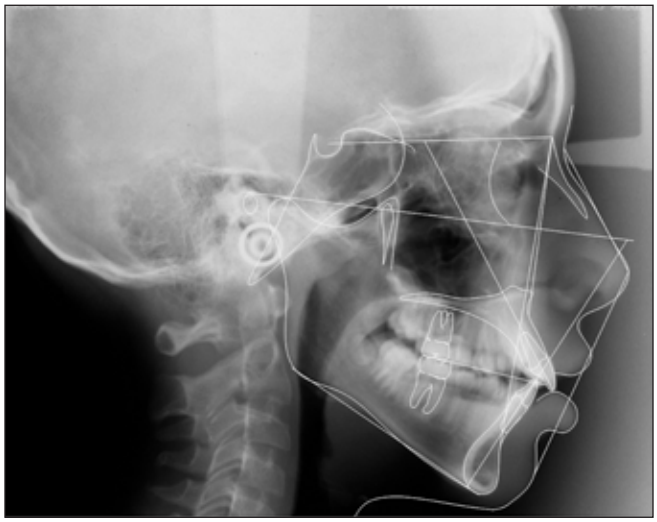


Figure 8: Final Cephalogram

DISCUSSION

Early treatment is defined as a treatment undertaken at the primary and transitional dentition.[12] Although this issue has been widely discussed it has always been controversial. On the other hand, on regard to deleterious habits control, there seems to be a consensus towards the need for early intervention.[5,7,8,13,14] Our case report corroborates this idea since the treatment began as soon as the open bite was diagnosed and patient was at six-year-old.

During the transitional dentition phase several treatment modalities are offered to intercept deleterious habits. The decision to use palatal spurs and palatal crib as aids in the control of finger sucking and tongue thrusting in this case was due to their efficacy, as reported in the literature.[9,11] We were concerned about the cessation of the harmful habits as soon as possible in order to take advantage of the physiologic period of the upper incisors eruption.[5,6] We expected incisors to tend to the normal pattern of eruption once all mechanical barriers were removed.

It is also of paramount importance to carefully differentiate a pure dental open bite from a skeletal open bite because treatment approach might be different.[15] In our case report, although patient exhibited an anterior 9 mm open bite, initial cephalometric analysis showed that vertical growth was within normal limits. This aspect was mandatory when deciding that treatment main objective was to remove deleterious habits in order to re-establish physiologic incisors eruption. On the other hand, in skeletal open bite cases growth modification therapies might be necessary such as headgears, functional appliances or both.[15,16]

Although scientific available data on the stability of open bite treatment reveals only weak evidence about certain treatment modalities[17], the use of lingual and palatal crib has proven to be highly stable.[11] In our case report, a 3 years follow-up revealed the stability or the treatment undertaken which highlights the need to remove the primary etiology of the malocclusion.

Among the advantages of an interceptive treatment some could be addressed such as: simplification of the second phase treatment; reduced need for permanent tooth extractions and orthognathic surgery; reduced root resorption and periodontal problems; reduced risk of upper incisors trauma; increased patient compliance as well as psychological benefits. Conversely, there are some disadvantages including difficulty in predicting dentofacial growth, decreased biomechanical control when compared to conventional orthodontics, and increased total treatment time.[5,13]

In this case report a second phase with fixed appliance was not necessary. Although the results achieved in the early treatment undertaken did not fulfill all ideal occlusal standards, function was found to be adequate and aesthetics was considered satisfactory by both the parents and the patient, who chose not to undergo the second treatment phase. Some authors claim that only a small percentage of cases are actually solved with interceptive orthodontics alone, while the majority require a second phase treatment.[18] Ultimately, when diagnosis and early treatment are properly carried out excellent results can be achieved, which corroborates this case report. [19]

An effective treatment is defined as the one that has satisfactory results. On the other hand, the term efficiency is given to those effective treatments that were concluded in the minimum possible time.[20] According to these guidelines, this treatment was effective, having achieved excellent results, both esthetically and functionally. However, it was not efficient. The amount of time taken in phase 1 therapy was too long (five years), which included an active phase (almost two years) and a monitoring phase (another three years).

CONCLUSIONS

In summary, this article underscores the importance of an early diagnosis by dentists, mainly pediatric dentists, and the efficacy of our treatment approach, offering a simple solution to an otherwise complicated problem.

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