Keywords

Modified Rapid Palatal Expander; Scissor bite.

ABSTRACT

Background Scissor bite is a rare malocclusion that often leads to minor facial asymmetry. An orthodontic and orthopaedic correction is advisable in young patients to prevent subsequent temporomandibular diseases requesting maxillofacial intervention.

Case report In this case report a 8-year-old girl in mixed dentition with unilateral left scissor bite was treated with a modified Rapid Palatal Expander. To modify an overexpanded maxilla (width 39 mm measured between both upper first molars) the device was used to close rather than to expand, without need of patient compliance. Orthodontic correction was then completed with traditional bracketing. Results were tangible (width 36 mm) and remained stable for at least 2 years after retention. This original device has proved to be useful in this kind of situations and can be easily applied to young patient to correct such malocclusions.

Scissor bite in a young patient treated with an orthodontic-orthopedic device. A case report

Introduction

Face asymmetries are widespread among the population: this particular can be easily noticed mirroring the left and right halves of the face. A normal degree of asymmetry is due to the variability of the human species and is not considered pathological. In some cases, however, this facial shape can be identified at an early age and an adequate intervention is therefore requested to prevent the problem from skeletally consolidating, making a future maxillofacial correction necessary. The scissor bite is a condition that can lead to this type of asymmetry. It is defined as a transversal discrepancy posteriorly in the maxilla where the palatine surface of the maxillary teeth is found in connection with the vestibular surface of the lower teeth. In this way the physiological cusp-pitch contact is missing [Proffit and Fields, 2000; Pirttiniemi, 1994; Bishara et al., 1994].

In the young patient scissor bite may not be urgent, but it can hide a problem with the temporomandibular joint (TMJ) that can become manifest with growth [Pinho, 2011]. Many devices and orthodontic techniques have been proposed [Pirttiniemi et al., 1990; Favero et al., 2002] for the correction of this defect at an early stage, including the use of an expander applied to the lower arch, intra-arch elastic for the closure of the upper maxilla and criss-cross inter-arch elastics. The rapid expansion of the palate is an orthopaedic procedure routinely used in orthodontics. Its purpose is to obtain a medium-palatine suture distraction before its final ossification, widening the transverse diameter of the maxilla [Haas, 1965; Haas, 1970; Haas, 1980]. This case report describes the innovative use of the palatal expander, which exploits the central screw to bring near the two halves of the device and decrease the transverse diameter of the upper jaw.

Case report

Diagnosis

An 8-year-old girl in mixed dentition presented with right complete scissor bite, including the first permanent molar (Fig. 1). The patient was at the beginning of the second stage of mixed dentition and showed a Class I occlusion on both sides. The incisors showed a Class II relationship, an increased overjet and a decreased overbite. The midline lines were not coincident. On the right side, a scissor bite on all the lateral posterior

FIG. 1 Complete right side scissor bite.
teeth was remarkable. The palate was very large and overexpanded (width 39 mm measured between both upper first molars), with presence of diastema between the incisors. The lower arch showed a contraction on the right side with lingual torque of the teeth and due to the torque the arch form was symmetric. The tongue was large too and seemed to be postured upon the lower arch. Oral hygiene was acceptable. The oral movements were not perfect, while opening and protruding the mandible an initial left movement was remarkable. The patient neither referred pain, nor functional limitations.

**Device description**

A modified RPE was prepared using cast models to simulate palatal contraction (Fig. 2, 3, 4).

- The arms were provided with two acrylic bites beside the incisors, with the function of centering the mandible at the end of the activation of the appliance by maintaining the centered position of the mandible.
- Some buttons were soldered on the vestibular side of the right arm of the RPE to allow anchorage of X-elastics, with the purpose of correcting the dental torque between upper and lower arch (Fig. 5).
- The RPE was applied with the screw opened and then closed, till the resolution of the scissor bite. The number of activations was programmed before by the simulation of the contraction on model casts.

**First phase treatment**

The main aim of the orthodontic treatment was solving the asymmetry and prevent the possible development of TMJ problems related to the scissor bite. For these reasons it was decided to carry out a two phase treatment. The first phase of treatment took into consideration the following points.

- Centering the midline and the position of mandible.
- Eliminating the upper condition of the scissor bite by contracting the upper arch.
- Correcting the dental relation with the scissor bite by changing the torque of the teeth, especially in the lower arch.
- Correcting of the sagittal occlusal relation, in particular of the front between the incisors (Class II, overjet, overbite).
Reducing to the minimum the complexity of treatment.
The Rapid Palatal Expander (RPE) was banded with one activation per week and elastics were applied. The scissor bite was easily resolved and the RPE was debanded seven months later. Then the upper arch was banded and a Class II utility arch was applied. In the lower arch a lip bumper was applied. The utility arch was activated by using Class II elastics and an anterior vertical elastic anchored to the acrylic portion of the lip bumper. This stage took five months. The first phase lasted 14 months.

Second phase treatment
There was a two years interval between the first and second phase. The second phase of treatment was in relation to the new dental problems emerged after completing the dentition: the objectives of the treatment were the correction of the rotations, a good dental alignment with space closure, a good intercuspidation and coordination of both arches. During phase two the upper and the lower arches were bonded and NiTi .018 round wires were inserted. Lingual buttons were bonded to correct derotation of the premolars, by using elastic chain to the wire. Lower and upper coordinate SS wires and Class II elastics completed the treatment. The second phase took about ten months.

End of treatment
At the end of treatment, the real problem of initial malocclusion seemed to be disappeared. There was no evidence of asymmetry between the right and the left part of the face. The lower part of the profile seemed to have a good sagittal relation, maintaining however a good bipostrusion. Intraorally, the arch form was symmetric with a good shape, a good occlusion was remarkable on both sides. On the posterior left side the scissor bite had completely disappeared. The midline line was centered. Also the incisor relationship was good: the incisal Class II had been corrected. The overjet was normal. The dental overbite was still slightly decreased. One thing is remarkable: the trasversal width between both upper first molars decreased from 39 mm to 36 mm after the first phase of treatment. No sign of TMJ disorders or muscle tenderness were present.

As the philosophy of the interceptive treatment suggests, the first stage of treatment was absolutely necessary and effective and the second stage of therapy was simple and short, with real benefit for the patient. Second phase lasted 10 months. A Hawley removable plate was used as upper retainers, while 3-3 bonded lingual retainers were used for the lower arch.

Follow up
The follow-up evaluation one year and eight months out of treatment shows good stability of the skeletal and dental parameters (Fig. 6, 7, 8). From the frontal view, the face is still symmetrical and harmonic, the smile is attractive. The sagittal and vertical relationships have remained unchanged and the occlusion and interdigitation have further improved thanks to post-treatment settling. A good future prognosis of stability can be expected, even if it is noticeable that the maxilla has a tendency to expand probably because of the tongue position.

References