Sleep Medicine 65 (2020) 170–171

Contents lists available at ScienceDirect

Sleep Medicine

journal homepage: www.elsevier.com/locate/sleep

Editorial

Expansion of the maxilla in adults with OSAS: myth or reality?

Obstructive sleep apnea syndrome (OSAS) continues to be a therapeutic challenge despite the advances achieved over recent decades. Among the many treatment options available, the choice between them still depends more on the professional's preferences and tendencies rather than on the needs indicated by the disease. The scarcity of randomized and controlled comparative studies makes it difficult to assess the differences between the various therapeutic modalities currently accessible [1].

The treatment options for OSAS include nasal, oropharyngeal, lingual and face as well as neck skeletal surgical procedures (separately or in conjunction) using a wide range of techniques and combinations. Among these methods, facial skeletal surgery has been found to be poorly accepted by patients, despite the cure rates achieved. Continuous positive airway pressure (CPAP) continues to be the first-choice therapeutic option in many institutions. Adherence to use of CPAP remains a barrier to be surmounted and its efficacy has been questioned on many fronts [1]. Intraoral devices also have a place among the vast range of therapeutic options that can be selected. However, neither intraoral devices nor CPAP has the capacity to cure OSAS. These methods are only a means for maintaining the patency of the airways while they are in use [2].

New methods for treating OSAS such as stimulation of the hypoglossal nerve and transcutaneous electrical stimulation have been studied, with promising preliminary results [3].

Yet, what would the alternative be, when conventional surgery, CPAP and intraoral devices fail? Such failures have constantly been observed.

Expansion of the maxilla (ERM) was created by Angle in 1860 to treat dental-maxillary discrepancies in children and adolescents. Since then, a variety of techniques and types of devices have been proposed in the literature and the indications for their use have gone beyond the limits of dental occlusion treatments [4].

ERM in children is widely accepted and is based on opening the palatine suture, which in this age group has not yet become calcified. Its benefits in relation to OSAS have already been discussed, and this forms a promising route for dealing with OSAS in childhood [5].

Expansion of the maxilla has the beneficial side effect of increasing the width of the nose, which would diminish the nasal resistance to the passage of air. Another matter that remains unclear relates to the increased size of the upper dental arch; this would increase the buccal space, thus giving the tongue more room and enabling it to occupy a more anterior position, which theoretically would diminish the collapsibility of the airway. Furthermore, it can be supposed that if the maxilla is expanded, there will be tension in the muscles that connect it to the palate, such as the palatoglossal and palatopharyngeal muscles, with anterior displacement associated with these muscles. Therefore, this could also reduce the collapsibility of the upper airways during sleep [6].

Expansion of the maxilla in adults has been studied recently, initially with a view to using this treatment to correct dental malocclusion (unilateral or bilateral crossbite and maxillary atresia). It has been observed that, in addition to obviously increasing the intraoral space, this expansion also gives rise to expansion of neighboring structures, especially the nasal structures. Expansion in adults was initially done at the cost of surgically opening the sutures of the middle third of the face. Thus, this was a major surgical procedure [7].

Yoon et al., proposed the distraction osteogenesis maxillary expansion (DOME) technique, in which orthopedic expansion of the maxilla is performed using mini-implants, with the expander apparatus fixed bilaterally to the palatine suture [8]. DOME involves use of limited LeFort I osteotomy, which does not require breakage of the pterygoid sutures but only breakage of the anterior part of the palatine suture. This study [8] presented promising results from this technique for treating OSAS in adults. Moreover, it brought up a matter that has repeatedly been discussed: does maxillary expansion occur in adults? Is there a need to surgically break the sutures for expansion to take place?

The presentation of DOME demonstrated how surgical techniques for maxillary expansion have evolved, such that only the most anterior part of the suture has to undergo resection. Alternately, would it be possible to achieve palatine expansion without any surgery?

For more than a decade, studies have been showing that this is possible. The concept of nonsurgical maxillary expansion is a matter that has cropped up repeatedly in the literature, although the consensus is that, as patients leave adolescence behind them, this type of expansion ceases to be viable; and that instead of this, surgically assisted rapid expansion becomes necessary. This dilemma still seems to be accepted as an orthodontic paradigm to be overcome. Nonetheless, there are around 10 studies, both new and not so new, that support the hypothesis that maxillary expansion in adults can be done without the need to surgically open up the sutures [6,9–17].

This was expressed well by Dr Chester Handelman: “The specialty of orthodontics has been reluctant to accept expansion in most situations. However, when the evidence-based literature demonstrates success in cases of nonsurgical expansion in adults, it is time to change the paradigm [6].

Is it time to change the paradigm? The article by Audrey Yoon, Christian Guilleminault, Soroush Zaghi and Stanley Yung-Chuan Liu certainly invites us to apply an old tool in a new way, to treat a condition that remains challenging: OSAS [8].

https://doi.org/10.1016/j.sleep.2019.06.014

Disclosure statement

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome. We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us. We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property. We further confirm that any aspect of the work covered in this manuscript that has involved either experimental animals or human patients has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript. We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author and which has been configured to accept email from: almiromachadophd@gmail.com.

References

[1] Abdullatif J, Certal V, Zaghi S, et al. Maxillary expansion and maxillomandibular expansion for adult OSA: a systematic review and meta-analysis. J Cranio-Maxillofacial Surg 2016. https://doi.org/10.1016/j.jcms.2016.02.001.

[2] Machado Junior AJ, Pauna HF, Crespo AN. Oral appliance in obstructive sleep apnea syndrome. Sleep Med (Amsterdam. Print) 2017;32:122–3.

[3] Machado Júnior AJ, Crespo AN, Pauna HF. Transcutaneous electrical stimulation in obstructive sleep apnea: is there a light at the end of the tunnel? ENT-Ear Nose Throat J 2019;04. 014556131984746.

[4] Machado Junior AJ, Crespo AN, Pauna HF. Rapid maxillary expansion in pediatric patients with obstructive sleep apnea: current and future perspectives. Sleep Med 2018;51:7–8.

[5] Machado-Júnior AJ, Zancanella E, Crespo AN. Rapid maxillary expansion and obstuctive sleep apnea: a review and meta-analysis. Med Oral Patol Oral Cir Bucal 2016;21(4):e456–9.

[6] Handelman C. Palatal expansion in adults: the nonsurgical approach. Am J Orthod Dentofacial Orthop 2011;140:462–9.

[7] Liu SY, Guilleminault C, Huon LK, et al. Distraction osteogenesis maxillary expansion (DOME) for adult obstructive sleep apnea patients with high arched palate. Otolaryngol Head Neck Surg 2017;157:345–8.

[8] Yoon Audrey, Guilleminault Christian, Zaghi Soroush, et al. Distraction osteogenesis maxillary expansion (DOME) for adult obstructive sleep apnea patients with narrow maxilla and nasal floor. Sleep Med 2019;65:172–6.

[9] Capelozza Filho L, Cardoso Neto JC, da Silva Filho OG, et al. Non-surgically assisted rapid maxillary expansion in adults. Int J Adult Orthod Orthognath Surg 1996;11:57–66.

[10] Bassarelli T, Dalstra M, Melsen B. Changes in clinical crown height as a result of transverse expansion of the maxilla in adults. Eur J Orthod 2005;27:121–8.

[11] Machado Júnior AJ, Crespo AN. Cephalometric study of alterations induced by maxillary slow expansion in adults. Braz J Otorhinolaryngol (Online) 2006;72:166–72.

[12] Ghergu Jianu A, Chaqués-Asensi J, Llamas Carreras JM, et al. Nonsurgical maxillary expansion in adults: report on clinical cases using the Hyrax expander. Minerva Stomatol 2019;68:95–103. https://doi.org/10.23736/S0026-4970.19.04178-5.

[13] Handelman CS, Lin Wang L, BeGole EA, et al. Nonsurgical rapid maxillary expansion in adults:report on 47 cases using the Haas expander. Angle Orthod 2000;70(2).

[14] Handelman CS. Nonsurgical rapid maxillary alveolar expansion in adults: a clinical evaluation. Angle Orthod 1997;67:291–308.

[15] Vanarsdall JrJr. Commentary: nonsurgical rapid maxillary alveolar expansion in adults: a clinical evaluation. Angle Orthod 1997;67:306–7.

[16] Mew J. Letters: rapid maxillary expansion. Angle Orthod 1997;67:404.

[17] Iseri H, Ozsoy S. Semirapid maxillary expansion—a study of longterm transverse effects in older adolescents and adults. Angle Orthod 2004;74:71–8.

Almiro J. Machado Júnior*, Agrício N. Crespo
Department of Otorhinolaryngology, Head and Neck Surgery, University of Campinas (UNICAMP), Campinas, São Paulo, Brazil

* Corresponding author. Rua Maria Monteiro, 841 ap 11 Cambui, 13025151, Campinas, São Paulo, Brazil.
E-mail address: almiromachadophd@gmail.com (A.J. Machado Júnior).

Available online 3 July 2019