



Brazilian Journal of  
**OTORHINOLARYNGOLOGY**

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ORIGINAL ARTICLE

## Short-term evaluation of tegumentary changes of the nose in oral breathers undergoing rapid maxillary expansion<sup>☆</sup>

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Received 12 March 2017; accepted 28 May 2017

### KEYWORDS

Nose;  
Soft-tissue;  
Maxillary expansion;  
Multislice computed tomography

### Abstract

**Introduction:** Rapid maxillary expansion is an orthodontic and orthopedic procedure that can change the form and function of the nose. The soft tissue of the nose and its changes can influence the esthetics and the stability of the results obtained by this procedure.

**Objective:** The objective of this study was to assess the changes in nose dimensions after rapid maxillary expansion (RME) in oral breathers with maxillary atresia, using a reliable and reproducible methodology through computed tomography.

**Methods:** A total of 30 mouth-breathing patients with maxillary atresia were analyzed and divided into a treatment group who underwent RME (20 patients, 10 of which were male and 10 female, with a MA of 8.9 years and a SD of 2.16, ranging from 6.5 to 12.5 years) and a Control Group (10 patients, 5 of which were male and 5 female, with a MA of 9.2 years, SD of 2.17, ranging from 6.11 to 13.7 years). In the treatment group, multislice computed tomography scans were obtained at the start of the treatment (T1) and 3 months after expansion (T2). The patients of the control group were submitted to the same exams at the same intervals of time. Four variables related to soft tissue structures of the nose were analyzed (alar base width, alar width, height of soft tissue of the nose and length of soft tissue of the nose), and the outcomes between T1 and T2 were compared using Osirix MD software.

<sup>☆</sup> Please cite this article as: Badreddine FR, Fujita RR, Cappellette M. Short-term evaluation of tegumentary changes of the nose in oral breathers undergoing rapid maxillary expansion. Braz J Otorhinolaryngol. 2017. <http://dx.doi.org/10.1016/j.bjorl.2017.05.010>

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Peer Review under the responsibility of Associação Brasileira de Otorrinolaringologia e Cirurgia Cérvico-Facial.

**PALAVRAS-CHAVE**

Nariz;  
 Tecidos moles;  
 Expansão maxilar;  
 Tomografia  
 computadorizada  
 multislice

**Results:** In the TG, the soft tissues of the nose exhibited significant increases in all variables studied ( $p < 0.05$ ), whereas, changes did not occur in the control group ( $p > 0.05$ ). In the treatment group, mean alar base width increased by 4.87% ( $p = 0.004$ ), mean alar width increased by 4.04% ( $p = 0.004$ ), mean height of the soft tissues of the nose increased by 4.84% ( $p = 0.003$ ) and mean length of the soft tissues of the nose increased by 4.29% ( $p = 0.012$ ).

**Conclusion:** In short-term, RME provided a statistically significant increase in the dimensions of the soft tissues of the nose.

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### Avaliação de curto prazo das alterações tegumentares do nariz em respiradores orais submetidos à expansão rápida da maxila

#### Resumo

**Introdução:** A Expansão Rápida da Maxila é um procedimento ortodôntico e ortopédico que pode alterar a forma e a função do nariz. Os tecidos moles do nariz e suas alterações podem influenciar a estética e a estabilidade dos resultados obtidos por esse procedimento.

**Objetivo:** O objetivo desse estudo foi avaliar as alterações nas dimensões do nariz após Expansão Rápida da Maxila em respiradores orais com atresia maxilar, usando uma metodologia confiável e reproduzível através de tomografia computadorizada.

**Método:** Um total de 30 pacientes respiradores orais com atresia maxilar foram analisados e divididos em um grupo de tratamento, submetidos à ERM (20 pacientes, 10 dos quais do sexo masculino e 10 do sexo feminino, com média de idade de 8,9 anos e DP de 2,16, variando de 6,5 a 12,5 anos) e um grupo controle (10 pacientes, sendo 5 do sexo masculino e 5 do sexo feminino, com média de idade de 9,2 anos, DP de 2,17, variando de 6,11 a 13,7 anos). No grupo tratamento, foram realizados exames de tomografia computadorizada multislice no início do tratamento (T1) e 3 meses após a expansão (T2). Os pacientes do grupo controle foram submetidos aos mesmos exames nos mesmos intervalos de tempo. Foram analisadas quatro variáveis relacionadas às estruturas dos tecidos moles do nariz (largura da base alar, largura alar, altura do tecido mole do nariz e comprimento do tecido mole do nariz) e os desfechos entre T1 e T2 foram comparados, utilizando-se o software Osirix MD.

**Resultados:** No grupo tratamento, os tecidos moles do nariz apresentaram aumentos significativos em todas as variáveis estudadas ( $p < 0,05$ ), enquanto isso não ocorreu no GC ( $p > 0,05$ ). No GT, a largura média da base alar aumentou 4,87% ( $p = 0,004$ ), a largura média alar aumentou 4,04% ( $p = 0,004$ ), a altura média dos tecidos moles do nariz aumentou 4,84% ( $p = 0,003$ ) e o comprimento médio dos tecidos moles do nariz aumentou 4,29% ( $p = 0,012$ ).

**Conclusão:** A curto prazo, a expansão rápida da maxila proporcionou um aumento estatisticamente significativo nas dimensões dos tecidos moles do nariz.

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## Introduction and background

Maxillary atresia is considered a form of skeletal deformity characterized by a discrepancy in the maxilla/mandible relationship in the transverse plane which may lead to a posterior crossbite.<sup>1,2</sup> This clinical condition can cause many problems such as developmental abnormalities of the face and of occlusion, mouth breathing,<sup>3,4</sup> premature teeth loss and even postural problems involving irregular development of the body.<sup>5-7</sup>

Angell,<sup>1,2</sup> in 1860, was the first researcher to describe the possibility of opening the mid-palatal suture to achieve transverse maxillary correction, however, it was Hass<sup>8,9</sup> who

published the first studies that clarified the real benefits of this treatment modalities. From Hass' studies the utilized methods for rapid maxillary expansion became clearer and more standardized.<sup>10</sup>

Since then, innumerable experiments have been conducted demonstrating the importance of rapid maxillary expansion (RME) in facial development and occlusion.

In his previous studies, Haas pointed out the positive results/aspects in the nasal cavity after using the appliance. Later on, it was proved that, although there was a narrow anatomic relationship between the maxilla and the nasal cavity,<sup>11</sup> RME was capable of changing this nasal physiology and anatomy.<sup>7,11,12</sup> In many cases, it could improve breathing

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