

## LETTERS TO THE EDITOR

*Re: Partitioning of ventilation between nose and mouth: The role of nasal resistance (AJO/DO 1989;95:432-8)*

*To the Editor:*

There is considerable controversy as to whether upper airway compromise and/or nasal obstruction lead to abnormal dentofacial development. Orthodontists are vitally concerned regarding answers to this question. The cephalometric studies of children with nasal obstruction/upper airway compromise by Hannuksela,<sup>1</sup> Shapiro and Shapiro,<sup>2</sup> Linder-Aronson and Woodside,<sup>3</sup> and McNamara<sup>4</sup> all support this thesis. The primate studies by Harvold,<sup>5,7</sup> Vargervik et al.,<sup>8</sup> and Miller et al.<sup>9</sup> strongly support this thesis also.

However, all are not in agreement. The rhinomanometric studies by Vig et al.<sup>10,11</sup> attempt to say just the opposite. A (selective) literature review by O'Ryan et al.<sup>12</sup> and earlier studies (in the fifties) by Howard<sup>13</sup> and Leech<sup>14</sup> also deny any relationship between upper airway compromise/nasal obstruction and abnormal dentofacial development. Conversely, an extensive literature review by Rubin<sup>15,16</sup> strongly supports the thesis. For these reasons it is imperative that concrete evidence be presented so that orthodontists can make knowledgeable decisions regarding potential otorhinolaryngology referrals. Orthodontists need to know what studies can be used to help select patients for these referrals.

Your readership should be advised that knowledgeable otolaryngologists rarely, if ever, recommend corrective upper airway surgery or dentofacial consultation unless there are a number of significant quality of life considerations involved. These include loud snoring, obstructive sleep apnea (sleep lab evaluation), year-round advanced nasal obstruction,<sup>17</sup> hyposmia, developing long-face syndrome, or some other form of aberrant dentofacial development.

Orthodontists should know that there is a high correlation between loud snoring, abnormal sleep lab study, and upper airway compromise.

Therefore the key elements in the clinical evaluation of the children in this study should have included the following:

### History

- Loud snoring
- Obstructive sleep apnea<sup>18-28</sup>
- Year-round nasal obstruction<sup>17</sup>
- Dysphagia
- Hyposmia
- Hot potato voice
- Acid reflux
- Neuromuscular dysfunction

### Physical examination

- Marked tonsillar hypertrophy<sup>29</sup>
- Macroglossia<sup>30</sup>
- Tight upper and lower dental arches<sup>31</sup>
- Long-face syndrome
- Gummy smile
- Malocclusion/Class
- Hypertrophy of the inferior turbinates

### Radiograph analysis: Cephalometric radiograph

- Adenoidal pad touching soft palate
- Hypertrophy of the inferior turbinates
- Tight nasal vault (CT scan/coronal projection)
- Increased mandibular plane
- Upper face/lower face ratio (45/55)

### Sleep lab analysis

- Oxygen desaturation
- Loud snoring
- Wide esophageal pressure swings
- Obstructive sleep apnea
- Arrhythmias
- Myoclonus

These are the essential parameters of any good otorhinolaryngology workup of the patient with upper airway compromise and associated aberrant dentofacial development. In my opinion the authors were derelict in not including these parameters as part of this study.

Your readership should know that neuromuscular dysfunction, habit, nasal obstruction, and inferior turbinate engorgement at night all play a role in chronic mouth breathing. And chronic mouth breathing, with its attendant recruitment of perioral and suprahyoid muscle groups, leads in many cases to abnormal dentofacial development.<sup>5,9</sup>

Orthodontists should be advised that a good history and physical examination and appropriate radiographic studies and sleep lab parameters are much more important than nasal resistance studies in the overall assessment of the child who is being evaluated for the developing long-face syndrome. Nasal resistance studies should be placed in their proper perspective.

To conclude, Drs. Leiter and Baker had a unique opportunity to do a comprehensive evaluation of chronic mouth breathing children and yet they failed to do so. This is unfortunate. The authors have served only to further mystify the tunnel vision approach to this problem fostered by Drs. Warren, Vig, and O'Ryan.

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