Hard to achieve orthodontic stability? Answer may be blowing in the wind

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The majority of children today exhibit some degree of malocclusion, and it has been well documented that this is related to soft tissue dysfunction. In fact, it is now so well accepted that the muscles of the tongue, lips and cheeks play a major role in tooth position and jaw development that there are contemporary pre-orthodontic clinics around the world using myofunctional philosophy to treat children between the ages of 5 and 15 (Myobrace Pre-Orthodontic Center).

However, despite these evolutionary myofunctional treatment systems achieving outstanding results, a small percentage of cases that prove difficult to treat remains. This raises questions regarding what is causing these stubborn cases as well as how best to treat them when all obvious poor myofunctional habits, such as digit sucking, tongue postural issues and dysfunctional swallowing patterns, have all been addressed in the myofunctional sense. It appears that answers may be uncovered by examining the child’s airways and breathing patterns.

Relevant literature explains how mouth breathing is a significant factor in the aetiology of malocclusion. In short, when mouth breathing occurs, the tongue moves down in the mouth to allow the passage of air above it. Furthermore, an open-mouthed posture can affect the direction of growth as the muscles pulling on the jaws are affected. However, the real details of why children habitually mouth breathe are not so well documented.

Breathing dysfunction factors

Factor 1: Tongue and head posture
Breathing through the mouth causes the tongue to lower and also alters the head posture. This low tongue posture then leads to reduced airway patency and increased in vertical growth (Figs. 1a, b).

Factor 2: The Bohr effect and cellular hypoxia
It is important to be mindful that breathing dysfunction includes more than just mouth breathing. It also includes habitual hyperventilation, which may be treated with the Myobrace System, which encourages correct breathing. However, patients classified into Group 3, and in some instances those in Groups 1 and 2, are likely to require additional assistance.

Identifying habitual hyperventilators

Generally, habitual hyperventilators show:

• Mouth breathing, lips apart at rest. Shoulder/upper chest breathing at rest. Audible breathing at rest.
• Medical history of enlarged tonsils and/or adenoids, asthma, hay-fever, recurrent respiratory infections, snoring, teeth grinding or sleep apnea. Narrow upper arch form. Forward head/shoulder posture.

• Venous pooling. Typically, mouth breathers will exhibit venous pooling, which occurs as a result of the inferior orbital fissure becoming constricted due to low levels of CO2, which usually has a vasodilatory effect. Additionally, this causes a reduction in NSO (found in the paranasal sinuses), which is also vasodilatory and mixes with air when nasal breathing is predominant. Patients with narrow maxillae can be expected to have a smaller than average pterygomaxillary fissure. As a result of these two factors, there is less venous drainage from the inferior orbital vein, which has to pass through the narrowed pterygomaxillary fissure. Deoxygenated or venous blood then pools beneath the eyes. When patients habitually breathe through their mouth and have a narrow maxilla, they will show symptoms of venous pooling.

Summary of factors associated with venous pooling low blood CO2 caused by habitual hyperventilation, low NSO caused by a lack of nasal breathing, reduced vaso-dilation caused by low CO2 and N2O; small pterygomaxillary fissure as a result of constrained maxilla, and low tongue posture.

Conclusions

It is clear a correctly functioning tongue acts as a natural retainer, but when a patient habitually breathes through his or her mouth, the tongue is prevented from functioning in this correct way. In contrast, when the mouth remains closed and the tongue sits correctly, increased orthodontic stability can be expected.

Furthermore, when a patient maintains a closed-mouth posture and high-tongue posture, treatment time can be expected to lessen as forces exerted on the teeth and jaws will work favorably. Finally, it has been well-documented mouth breathing is not in the best interests of health, growth and correct development. Therefore, it is reasonable to assume encouraging correct functional breathing patterns will have a much more far-reaching effect than just correcting crooked teeth and jaws. Simply fixing the teeth and jaws is potentially missing a huge piece of the puzzle at the expense of possible health gains and future orthodontic stability.

References available from the publisher.