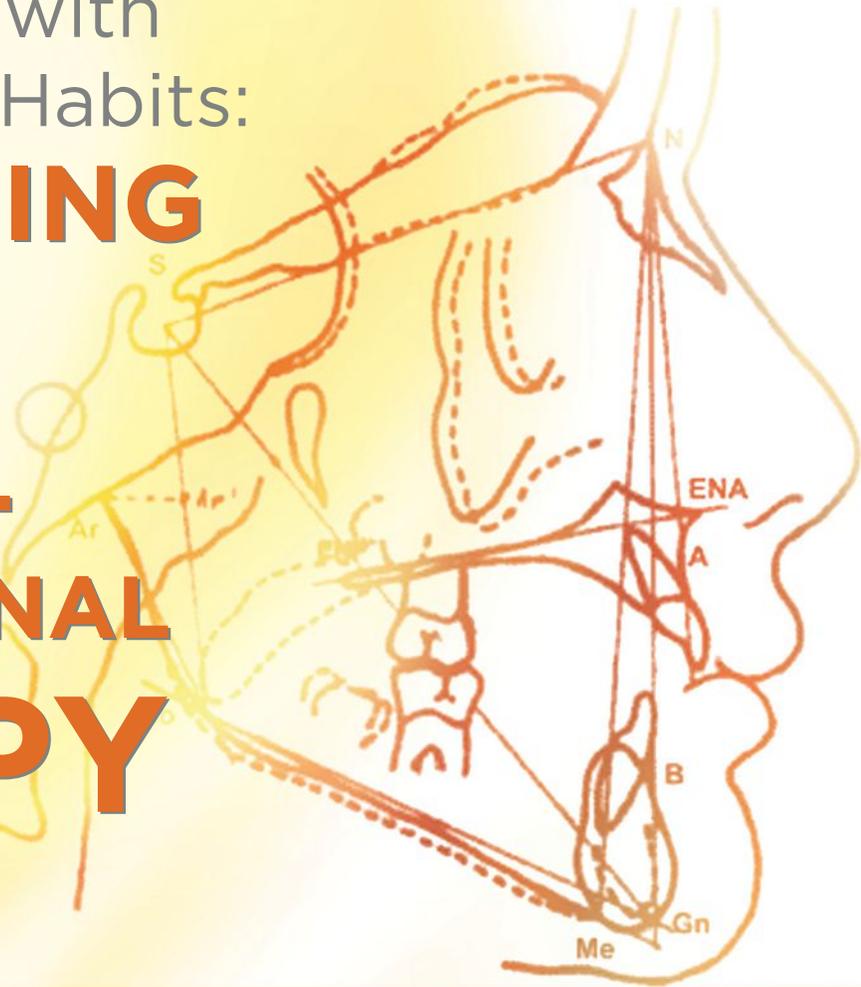


Treating Patients with Mouth Breathing Habits: **THE EMERGING FIELD OF OROFACIAL MYOFUNCTIONAL THERAPY**



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ABSTRACT:

Currently in the United States there is no formal license or degree program in orofacial myofunctional therapy. Other countries, such as Brazil, have a more formal university program with licensure. Now with awareness of muscular causes and habits as being one of the causes of TMD, OSA, and orthodontic relapse, the literature is showing that orofacial myofunctional therapy does help, when it is monitored and organized in a systematic program that incorporates habit elimination, a sequenced exercise protocol and in some cases, Buteyko breathing exercises. Therefore, more dentists are seeking this treatment for their patients. This paper will explore why orofacial myofunctional therapy is now becoming an accepted modality used in a multi-disciplinary team for many health care concerns.

After years of private practice and adding Buteyko⁴ breathing exercises to our treatment plan for those patients who have a mouth breathing habit, orofacial myofunctional therapists are hearing success stories from their referring physicians and dentists. For years, many felt the studies were not strong enough for physicians and dentists to support adding this treatment to their patient's treatment plans.



Fig. 1: "Before and After" thumb sucking treatment and six months of orofacial myofunctional therapy.

But, with a significant number of dentists adding additional revenue streams to their practice and a growing number of sleep physicians being inundated with patients who are not able to wear the CPAP and comply with recommendations to wear a dental sleep appliance, orofacial myofunctional therapy is gaining recognition as another possible alternative solution or adjunctive treatment. We need more studies because the field of sleep medicine, according to some researchers, may bankrupt our healthcare system, as we know it today.

Who is qualified to treat oral myofunctional disorders? A background in dental hygiene is an excellent qualification. Hygienists have a background working as preventative specialists when it comes to the mouth. They study the muscles, the oral tissues and human anatomy, physiology, as well as dental anatomy. They are motivators and have a background in teaching skills for the mouth. Plus, with the opening of the new hygiene schools, the timing is now ideal to expand the practice of dental hygiene to include orofacial myofunctional therapy.

Some speech pathologists are also becoming more interested in treating this disorder as well as physical therapists and occupational therapists. An army of well-trained professionals is needed to meet the future demand for services. There are continuing education courses available in this field and lately, many orthodontists, general dentists, hygienists and physicians are interested and are taking the courses.

Part of the training includes eliminating thumb sucking and other habits, which may interfere with proper growth and development.⁵ This treatment, if done early, may actually set up the stomatognathic system to develop properly. Coupled with mouth exercises to guide proper function and re-pattern the muscles, and orthodontic intervention to guide proper occlusion and arch development, this treatment may be proactive and preventative for many dental and medical problems. (Fig. 1)

One must also look at and be

aware of the role of morphology⁶ on the development of oral volume and proper oral function. Lingual and labial frenum attachments, if not treated or released early, can alter proper development.⁷ One problem with releasing restricted frenums is many times they reattach if not released properly or excised immediately after the surgery. Also, many times a posterior tongue-tie is left undiagnosed. In this case, the tongue

has a difficult time lifting and a skilled surgeon needs to release the fibers inside the tongue (Figs. 2 & 3).

“Living bone is extremely susceptible to the guidance and influence of pressure and stimuli”⁸. This quote by Dr. E. T. Klein, who was an orthodontist in the 1950s, was referring to the function of muscles. Proper breathing, swallowing and chewing will change position of the teeth.⁹

FORM AND FUNCTION

Why and how do bones and soft tissue change from their genetic pattern? The scientific explanation has long been sought by health care professionals (dentists, physicians, speech pathologists and dental hygienists). They have looked into how mechanical stress and strain applied to oral tissues improves the form and function of these tissues. As far back as the 1920s^{10, 11, 12} scientists demonstrated that mechanical stress and strain applied to collagenous tissue controls protein conformation (state).

The structure of collagen is known to exist in two states. The first state is the crystalline or ordered state in which collagen is found in a triple helical conformation. The second

FINALLY, THE SECRET HAS BEEN REVEALED REGARDING OROFACIAL MYOFUNCTIONAL THERAPY...IT REALLY DOES BELONG IN THE FIELD OF ORTHODONTICS¹, TREATING TMD² AND OSA³, AS WELL AS THE PREVENTION OF MANY DISORDERS.



Fig. 2: Anterior and posterior tongue tie.



Fig. 3: Before and after proper tongue placement.

state is considered to be the amorphous or non-ordered state. Mechanical stress and strain, such as exercise, drives collagen to the ordered state. Lack of mechanical stress and strain, allows collagen to revert to the amorphous state, as in lack of exercise.

An example of the phase transition of collagen can be found in the kitchen. Both forms of collagen are familiar especially if you have ever made a gelatin dessert. If you add the gelatin to hot water you can watch it dissolve as it swells in the hot water. This is the amorphous state. When cooling the mixture in a refrigerator, you can watch the gelatin become firm or "set up" as the molecules are transformed to the ordered or crystalline state. Just as cooling drives collagen, or gelatin to the crystalline state, mechanical stress and strain on oral tissues drives collagen to the crystalline state. This process is known as "stress induced crystallinity"¹³.

A differential susceptibility to enzymatic degradation exists for these two states. The crystalline or ordered state is less susceptible to enzymatic reactivity than the amorphous state due to geometric considerations. In other words, in the crystalline state, collagen molecules are tightly packed making them resistant to degradation. In the amorphous state these restrictions are removed. With the absence of mechanical stress and strain on the collagenous tissue the collagen protein will revert to its amorphous state and degrade this result is due to the differential susceptibility to enzymatic degradation for these two states¹⁴.

How does this mechanism relate to orofacial myofunctional therapy? At the point at which pressure is applied, collagen responds with growth and increased strength. The intervention of the health care professional as it relates to the pressure exerted by the tongue and lips in its proper resting position now becomes instrumental in improving oral anatomy and physiology. Proper chewing of unrefined foods can also develop the muscles of mastication and the peri-oral muscles this may have a direct effect on eliminating bruxism.

IMPORTANCE OF BUTEYKO BREATHING TECHNIQUE

For many years, the orofacial myofunctional therapist would fight

"...MANY OF THE MYSTERIES SURROUNDING OUR DAY-TO-DAY ACTIVITIES WITH PATIENTS LEADING TO IMPROVED ORAL FUNCTIONS CAN BE SHOWN TO BE GROUNDED IN SCIENTIFIC PRINCIPLES. MORE RESEARCH AND UNIVERSITY PROGRAMS IN OROFACIAL MYOFUNCTIONAL THERAPY IS NEEDED."

mouth breathing or an open mouth at rest posture. Two important goals of therapy are to develop a palatal tongue rest posture and a lip seal. If the patient mouth breathes chronically, therapy results would be limited or short lived. Now, by incorporating Buteyko breathing exercises with orofacial myofunctional therapy, results have improved. The Buteyko Method was developed in the 1950s by Russian doctor Konstantin Buteyko¹⁵ who recognized the negative effects from chronic over breathing.

Breathing through the mouth is a typical characteristic of chronic over breathing, the precursor often being a blocked nose. Habitual mouth breathing disturbs blood gases resulting in increased nasal congestion thus completing the vicious circle. The Buteyko Method involves learning to unblock the nose using a simple breath hold exercise, making the switch to nasal breathing on a permanent basis and adopting lifestyle guidelines to assist with this. Although the Buteyko Method is relatively new to the USA, it has enjoyed considerable awareness in Europe for the treatment of respiratory disorders. It has been featured in television documentaries¹⁶, the UK parliament House of Commons debate, and inclusion by Health Insurance companies¹⁷ and clinical trials^{18, 19, 20, 21}.

The link between open mouth breathing and increased risk of obstructive sleep apnea is well documented.^{22, 23, 24, 25, 26, 27} Kim et al observes that "the more elongated and narrow an upper airway during open-mouth breathing may aggravate the collapsibility of the upper airway and, thus, negatively affect OSA severity."²⁸ Given the available research, learning how to unblock the nose and switch to nasal breathing, may offer therapeutic benefits for sleep apnea.²⁹

Also, oropharyngeal exercises have been shown to lower AHI numbers by 39%, improve snoring frequency and intensity, daytime sleepiness, and sleep quality score in mild to moderate OSA.³⁰ Changes in neck circumference correlated inversely with changes in the AHI.

Therefore, many of the mysteries surrounding our day-to-day activities with patients leading to improved oral functions can be shown to be grounded in scientific principles. More research and university programs in orofacial myofunctional therapy is needed.

Currently, there is a shortage of well-trained orofacial myofunctional therapists in our country. For more information, please visit www.myoacademy.com and www.myofunctional-therapy.com.

REFERENCES

1. Smithpeter, Covell, AJODO, May, 2010
2. De Felicio, de Oliveira, da Silva, Cranio Oct, 2010
3. Grimaraes, et al, American Journal of Respiratory and Critical Care Medicine, May, 2009
4. Courtney, R, Cohen, M. J Altern Complement Med, 2008
5. Van Norman, R., Int J Orofacial Myology, 1997
6. Subtelny, J.D., Angle Orthod, 1970
7. Jang, S.J., et al, AJODO., 2011
8. Klein, E.T., Am J Orthod, 1952
9. Yamaguichi, H, Sueishi K., Bull. Tokyo dent. Coll., 2003
10. Wohlisch, E., de Rochemont, R., Biochem Z., 1926
11. Gekko, Koga S., Agri. Biol. Chem., 1983
12. Flory, P., Spur, O.K., J. Amer. Chem. Soc., 1956
13. Flory, P., Spur, O.K., J. Amer. Chem. Soc., 1956
14. Kaplan, D.G., American Chemical Society, 1994
15. McKeown, P., Close Your Mouth, 2004
16. <http://news.bbc.co.uk/2/hi/health/153320.stm>
17. www.avivahealth.ie/member-info/member-benefits/asthma-care-program/
18. Bowler SD, Green A, Mitchell CA., Med J Aust. 1998
19. McHugh P, Aitcheson F, Duncan B, Houghton F., N Z Med J. 2003
20. Cooper S, Osborne J, Newton S, et al. Thorax, 2003
21. McHugh P, et al, NZMJ, 2006
22. Young, et al, Internal Medicine, 2001
23. Ohki, M., et al, Acta Otolaryngology, 1996
24. Scharf, M.B., Cohen A.P., Allergy, Asthma, and Immunology, 1998
25. Pevernagie, D.A., et al Sleep Medicine Reviews, 2005
26. Storms, W., Prim Care Respir J., 2008
27. Staevska, M.T., Allergy Asthma Report, 2004
28. Kim, E.J., et al, European Otorhinolaryngol., 2010
29. www.publications.parliament.uk/pa/cm200102/cmhansrd/v0020625/debtext/20625-34.htm
30. Grimaraes, et al, American Journal of Respiratory and Critical Care Medicine, May, 2009