ABSTRACT
This document is intended for orofacial myologists who may be considering the expansion of clinical services into the area of sleep apnea and other sleep-related problems. Caution is urged at this time regarding the participation by orofacial myologists in sleep-related therapy. At present, there is a lack of sufficient supporting information to justify an appropriate clinical role for orofacial myologists with sleep-related problems.

KEY WORDS: sleep apnea; central sleep apnea; snoring; muscle tonicity; the soft palate (velum); the velopharyngeal port; didgeridoo.

INTRODUCTION
The field of orofacial myology is being actively courted by some dentists to become a clinical player in providing treatment for sleep apnea and associated conditions. Whether the field of orofacial myology currently has a clear role to play in the evaluation and treatment of sleep apnea, snoring, and other sleep-related conditions is unclear, undocumented and open to debate.

To date, a role for orofacial myologists in providing clinical services for individuals with sleep apnea and related problems is undefined and questionable with regard to the training, expertise, and credentials of orofacial myologists. There are no current clinical studies published in peer reviewed journals that adequately demonstrate the efficacy of myofunctional therapy with sleep apnea and related problems.

SLEEP-RELATED PROBLEMS
The area of sleep apnea and associated clinical problems is a current area of clinical focus in medicine and dentistry. The data regarding the nature of sleep-related problems and the ongoing clinical and research efforts to provide a framework for determining appropriate clinical treatment strategies is a continuing and incomplete process.

A few seminal references are part of the brief bibliography included with this document. This short list is not intended to fully characterize the burgeoning clinical research activities with the sleep apnea syndrome, but simply to identify some areas where research in fields other than orofacial myology is ongoing.

While some risk factors associated with patients who have or may develop sleep apnea are well accepted, such as obese men with an increase in neck circumference, many other biological components remain incompletely documented. The phenomenon of central sleep apnea is a case in point. This central problem is related to altered brain activity rather than representing a condition that can be addressed by muscle exercise.

Since not all factors associated with the sleep apnea syndrome are alike, the clinical decision process for developing treatment protocols needs to further evolve beyond current levels of
instrumental documentation. There is some preliminary evidence available to date that suggests that some patients may, or will, benefit from therapy that employs muscle exercise techniques developed in speech pathology and orofacial myology (Cooper, 2010; Guimaraes et al, 2009; Pitta et al, 2007).

Eventually, there may be an important role for the orofacial myologist in the therapy process as additional documentation of the characteristics of those exhibiting sleep-related problems become available. To date, however, data are sparse that show a strong link between the sleep apnea syndrome and muscle weakness, lack of tonicity, or orofacial postural problems involving the lips, tongue, soft palate and pharyngeal muscles that may be amenable to correction through exercise.

UNANSWERED QUESTIONS THAT LACK DOCUMENTATION
Some myofunctional clinicians have advanced therapy strategies to “tone” or otherwise strengthen the tongue, soft palate (velum), and pharyngeal walls as part of the therapeutic process with sleep apnea patients. Recommendations for treatment protocols have been made without documenting the specifics of the perceived problems with muscle tone, strength, or range of movement of the structures being implicated as constituting part of the sleep problem.

A first step for orofacial myologists interested in participating with sleep-related problems would be to develop evaluation techniques to systematically document levels of strength, tonicity, or laxity of the structures of interest in the orofacial complex. Without such data and techniques, therapy strategies designed to address presumed areas of concern lack an appropriate theoretical and clinical base for any therapy procedures that may be recommended. If any orofacial myologists have accumulated data regarding the specific features of muscle deficits with sleep apnea patients, it behooves them to share these data in some format that can be distributed to other orofacial myologists and other interested individuals.

RECOMMENDED AREAS OF CLINICAL RESEARCH WITH THE SLEEP APNEA SYNDROME: CHALLENGES FOR CLINICIANS
Some basic questions are in need of clarification and documentation before the recommendation can be merited that orofacial myologists should participate in the diagnostic and treatment process with patients with sleep-related problems. Some basic questions in need of elucidation include:

- What diagnostic tests link tongue or soft palate activity or status to the sleep apnea syndrome?
- What diagnostic tests indicate the need for muscle exercise as a treatment strategy to reduce or eliminate sleep-related problems? Have such tests been shown to be definitive?
- If there is a need to systematically identify and quantify the level of tonicity of the tongue, pre- and post-myofunctional therapy, what measures would be involved in such documentation?
- Is there value in teaching a forward, interdental tongue rest posture, or a tongue seal against the palate as a means of opening the airway with sleep apnea patients?
- Do exercises to “tone” or strengthen the tongue result in opening the airway during sleep? Or do they send a different message to the brain and create a new neuromuscular pattern?
• Do muscle strengthening exercises have a demonstrable impact on the rest posture of the tongue during sleep?
• Is there a need to systematically identify and quantify a problem with the tonicity, strength, or range of movement of the soft palate that would merit treatment with myofunctional therapy? If so, on what basis would this therapy be recommended?
• Should the velum be more active, or less active, and how will clinical documentation be accomplished pre- and post-treatment?
• Are there any data indicating that muscle exercise can influence the soft palate rest position and velar functions?
• If the pharyngeal walls need to be further toned or less toned, how will clinical decisions be made and verified pre- and post-treatment?
• What expertise can be claimed by orofacial myologists regarding the processes and problems involving the velopharyngeal mechanism and pharynx?

The questions posed above present a challenge to orofacial myologists who desire to work with the sleep apnea syndrome or other sleep-related problems. It should be obvious that many basic questions need to be asked and answered before appropriate tools of evaluation and treatment can be developed, and before the provision of clinical services by orofacial myologists with sleep apnea patients.

HOPE FOR THE FUTURE
Orofacial myologists may eventually play a significant role in the therapeutic process with sleep-related problems. While urging caution and encouraging research now, it is hoped that verifiable and reproducible tools of evaluation and treatment will evolve from subsequent clinical research. Each clinician with an interest in this clinical area has a responsibility to be a part of the process of developing appropriate and effective tools of evaluation and treatment.

A CASE IN POINT: THE SOFT PALATE
To illustrate the need for caution at this time in offering myofunctional therapy for patients with sleep apnea and snoring, the area of the soft palate and velopharyngeal mechanism can serve as an example. Some myofunctional clinicians and others outside of the discipline have advocated for the need to strengthen, lengthen, tone, or increase the range of movement of the soft palate and muscles of the pharynx associated with velopharyngeal (VP) closure. Such procedures have been studied extensively in both normal individuals and patients with repaired clefts, and have been found to be non-productive (Peterson-Falzone, Hardin & Karnell, 2010).

The theory behind the presumed need for such velar therapy is ill-conceived. This therapy would not be effective nor indicated because, in an opposite manner, snoring and sleep apnea are related to the inability of keep the VP port open, not closed. Therefore, theoretically, exercises for patients with sleep apnea should focus on muscles that open the VP mechanism and keep it open during sleep, rather than muscles that aid in VP closure.

Interest in the role of the velar muscles with sleep apnea problems has motivated interest in the didgeridoo instrument in reducing sleep apnea (Puhan et al, 2005). Use of this instrument as a therapy tool may eventually be shown to have a positive impact on the reduction of sleep apnea. The theory behind this is as follows: in order to play the very long tones that characterize the didgeridoo instrument, one must make use of a phenomenon called "circular breathing". This involves trapping the air in the mouth with the velum pulled down tightly on the tongue, while at the same time inhaling through the nose. Thus, one can paradoxically
draw air into the lungs through the nose while at the same time forcing air out of the mouth and into the instrument using the mouth and cheeks as a bellows.

The phenomenon of circular breathing is not unique to didgeridoo playing. It is also fairly common as well in the playing of traditional wind instruments. At this point in time, it can be postulated that playing the didgeridoo or other wind instruments that make use of circular breathing for a long time, might result in reducing sleep apnea or snoring in selected patients by keeping the velopharyngeal port more open during sleep. Follow-up studies related to this possible association are needed.

The problem with the identification of therapy solutions for the velum with sleep apnea conditions is a common one that crosses the several disciplines involved. The misunderstanding about the perceived and intended role of the velopharyngeal mechanism represents one of many issues and problems that will need to be clarified over time.

All who express clinical interest in this area will agree to the need for more research to fully describe the various components that may characterize an individual who suffers from sleep apnea. It is too early to assume that all problems have a focus in the soft palate or tongue. Patient selection will be a key in determining which patients may benefit from the therapy strategies and procedures of the orofacial myologist. Unfortunately, clinical research with sleep related problems, or any problems, is not being actively pursued by orofacial myologists in the USA. The bulk of current clinical research in the field of orofacial myology is being conducted by a variety of disciplines in Brazil.

SUMMARY
Many of the current confounding variables associated with the sleep apnea syndrome and the possible role of the orofacial myologist with sleep-related problems have been identified. The challenges ahead for orofacial myologists who wish to participate in the treatment process with sleep apnea and related conditions have been discussed. The ongoing processes of documentation with sleep-related programs in medicine and dentistry should include the participation of orofacial myologists. To this end, the following recommendations are offered:

RECOMMENDATIONS
- Orofacial myologists should learn to identify signs and symptoms of sleep disorders and make appropriate referrals.
- The problems associated with sleep apnea are multi-factorial; that is, there are a variety of causes that remain incompletely documented with current technology.
- Additional clinical research is needed before orofacial myologists should participate in treatment protocols for sleep-related problems.
- Orofacial myologists are encouraged to join and participate in multidisciplinary research groups that study and discuss sleep-related problems.
- Because of the multi-factorial nature of sleep-related conditions, including centrally-related sleep apnea, orofacial myologists are encouraged to participate with medical sleep teams, or individual physicians or dentists whose treatment protocols are closely coordinated with a medical sleep lab.
- It is hoped that an appropriate clinical role for orofacial myologists will evolve from forthcoming clinical research and an expanding data base. Until that time, orofacial myologists are advised to refrain from advising patients about any sleep-related procedures or theories, such as specific pillow type, sleep position,
or the need for specific myofunctional techniques to reduce sleep apnea symptoms.

- To date, there are insufficient data to include orofacial clinicians in the treatment process with sleep apnea and related conditions except by providing experimental therapies supervised by medical sleep clinics and research programs.
- At present, the treatment of sleep-related problems by orofacial myologists should be considered as experimental therapy. Insurance providers are also likely to view myofunctional therapy for sleep-related conditions as experimental, and accordingly, may not reimburse clinicians who provide such clinical services.
- It is incumbent upon orofacial myologists who may wish to provide therapy for sleep-related problems to inform patients that there is no compelling or well-verified experimental evidence at present to support the therapies offered, nor should members make any false promises or claims of success for services rendered.

REFERENCES


