Asia-Pacific Chiropractic Journal

Snoring and Obstructive Sleep Apnea:
A measurable neuromuscular ensemble of the Chiropractic patient's mouth and airway

Scott Cuthbert

Narrative: Obstructive Sleep Apnea (OSA) is a sleep disorder characterised by loud snoring and periods of silence while breathing, often followed by snorts or gasps as the individual attempts to breathe.

There are some simple remedies for this problem that will be described for patients with OSA and the more prevalent problem of 'snoring'. Some of our chiropractic patients with chronic snoring syndromes destroy the lives of their wives, husbands, and friends who sleep with them. Especially if your patient is a loud snorer, everyone in the patients' family house may be affected. As an estimated 1 billion people around the world suffer from OSA, this is a more common problem than many Chiropractors have developed the clinical tools for effective management.

Snoring is caused by the patient's inspired air not flowing smoothly through the throat or nasal passages, and vibrating over relaxed tissues as they breathe in or out. The soft palette at the back of the mouth and the muscles in the throat relax while the patient is sleeping. Over-relaxed (what are called "inhibited") throat and tongue and jaw muscles can create disturbances in the patient's airway, upsetting the flow of air through the throat. That is why substances that relax muscles, including alcohol and some drugs, increase snoring. In fact, any drug prompting deep sleep promotes snoring.

Indexing Terms: Chiropractic; AK; Applied Kinesiology; Obstructive sleep apnea; snoring.

Introduction

The assumption is you are managing a patient who snores and you are caring for their sleep apnea.

> *... when snoring is sufficiently severe that it prompts a partner to seek someplace else to sleep at night, that is the point when many snorers begin to consider their habit as a problem ...'*

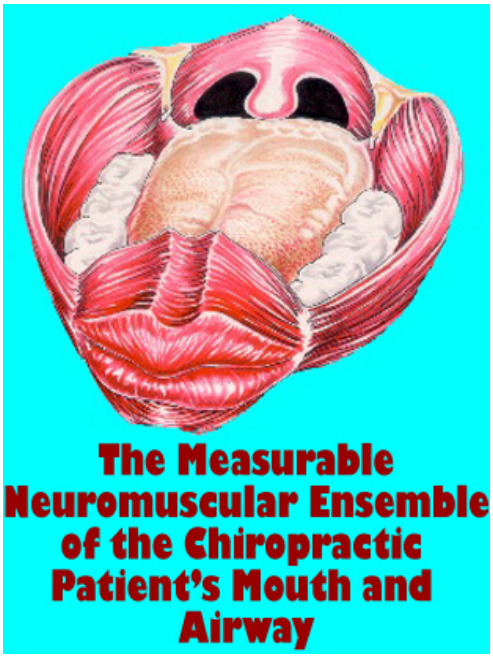


Figure 1: Schematic of mouth and airway

Chiropractic approaches

Throat exercises can help improve the functional condition of the snoring patient's oral cavity's muscular and neurological ensemble. Several mouth and tongue exercises may help you stop them trumpeting and sawing wood while in bed. Have them try to do 30 repetitions of these moves, and do them three times a day. In a few weeks, the patient's partner can give the you the report-card.

In functional neurology, practitioners rehabilitate the muscles of the oral cavity, jaw and tongue through exercises that make them stronger. Patients with poor 'airway flow' and weak throat muscles can tone them performing the following four exercises that make these muscles stronger. Masarsky and Todres-Masarsky(in Appendix 4 of their case report on Long Covid and Obstructive Sleep Apnea describe in this approach of the Journal) describes this procedure precisely: (2)

- Say 'Aaah'. (This simple phrase exercises the muscles you're trying to target and improve)
- Push the tip of the tongue against the roof of the mouth, and then slide it backward as far as you can.
- Gargle with water several times a day. The *vagus nerve* activates the muscles in the back of your throat that allow one to gargle. Gargling contracts these muscles which are not working properly at night. Drink several large glasses of water per day and gargle each sip until the glass of water is finished. Try to gargle long enough and deep enough to make it challenging.
- Sing as loudly as possible when in a car or at home. This strengthens the muscles at the back of the throat.

The AK Examination: A Chiropractic '*How to*'

In Chiropractic Applied Kinesiology analysis, the indications for checking on the function of the Hyoid Muscles in patients is as follows:

Problems may coexist in this clinical picture for patients with swallowing, TMJ dysfunction, cranial dysfunctions *(hypoglossal nerve* to the tongue and spinal accessory nerve to the neck and head), neurologic disorganisation, and phonation.

- 1. Therapy localisation. TL to *hyoid* without movement or challenge indicates possible pathology. TL to the neuromuscular spindle cells will produce the most accurate treatment.
- 2. Direct challenge to the hyoid bone:
  - Anterior - Stretches posterior belly of *digastric* and *stylohyoid* muscles.
  - Posterior -. Stretches anterior belly of *digastric*, *geniohyoid*, and *mylohyoid* muscles.
  - Superior - Stretches *omohyoid*, *thyrohyoid*, *sternohyoid*, and *sternothyroid* muscles.
  - Inferior - Stretches mylohyoid, *geniohyoid*, *digastric*, and *stylohyoid* muscles.
  - Lateral - Stretches posterior belly of *digastric*, *mylohyoid*, *omohyoid*, and others to a minor degree.

Treatment will usually be to spread apart the neuromuscular spindle cells, improving their strength, proprioception, mobility and function. (3)

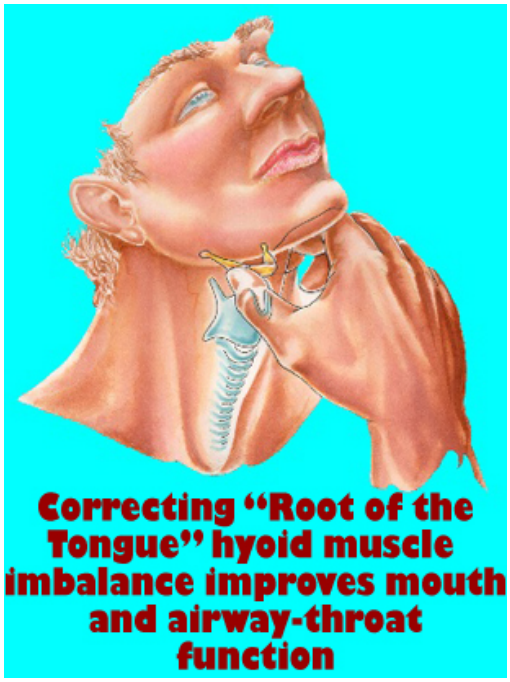
The *omohyoid* muscle may become tense and have trigger points that are a partial or complete cause of what appears to be entrapment by the *scalene* muscles. Travell and Simons (8) state '*Because the tense muscle stands out prominently when the head is tilted to the other side, it is easily mistaken for the upper trapezius or a scalene muscle*' The *omohyoid* can easily be evaluated for hypertonicity with the applied kinesiology *hyoid* challenge. This is accomplished by the physician grasping the *hyoid* bone and moving it superiorly and laterally to stretch the *omohyoid* muscle

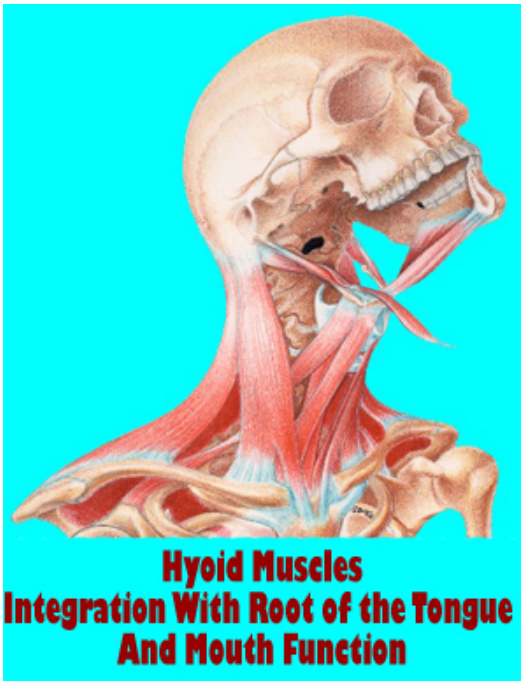
fibres. While the *hyoid* is held in this position, a previously strong indicator muscle is tested for weakening.

If there is dysfunction of the *omohyoid* muscle, it will often relate with what appears to be a neuromuscular spindle cell, which will show positive therapy localisation. When the neuromuscular spindle cell is effectively manipulated, the challenge test will be negative. Trigger points in the *omohyoid* muscle can be treated by stretching it with downward motion of the scapula and tilting the head to the opposite side. Ischæmic compression and percussion are also effective for trigger points in this area.

Manual muscle testing of upper body muscles will also show weakness upon the patient thrusting their tongue out, left or right, or pressing it to the top of their mouths. With a glove on, the physician 'works out' the tender points that will be found at the root of the tongue and floor of the mouth. This will improve mouth muscle function considerably.

Figures 2, 3: Hyoid and relationships





In an excellent paper by Waddell, Chiropractic Applied Kinesiology was found previously to resolve functional voice disorders and muscle tension dysphonia for a professional vocalist. (4)

It must be remembered by Chiropractors always that the muscles most commonly injured during motor vehicle accidents (MVA) are the SCM and scalene muscles. These muscles protect the head and neck from hyperextension by lengthening as they contract during a MVA until the forces of impact overcome the muscle contraction these muscles provide the patient. The l*ongus colli* and the *hyoid* muscles are also implicated in this protective mechanism. Panjabi estimates that in extreme extension the SCM and the anterior scalene muscles have less than 25% of their normal power compared to normal posture. (5)

Additional research integrating the hyoid bone within the biomechanics of the entire body exists. (6)

Figure 4: Integration of the stomatognathic system

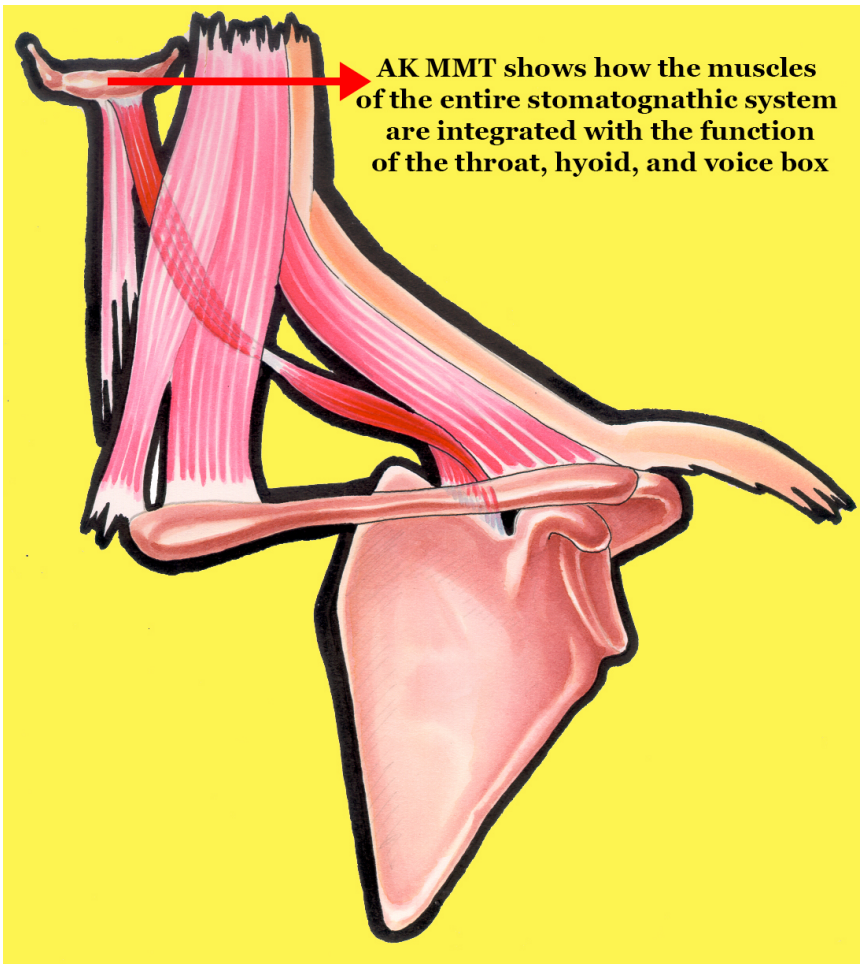
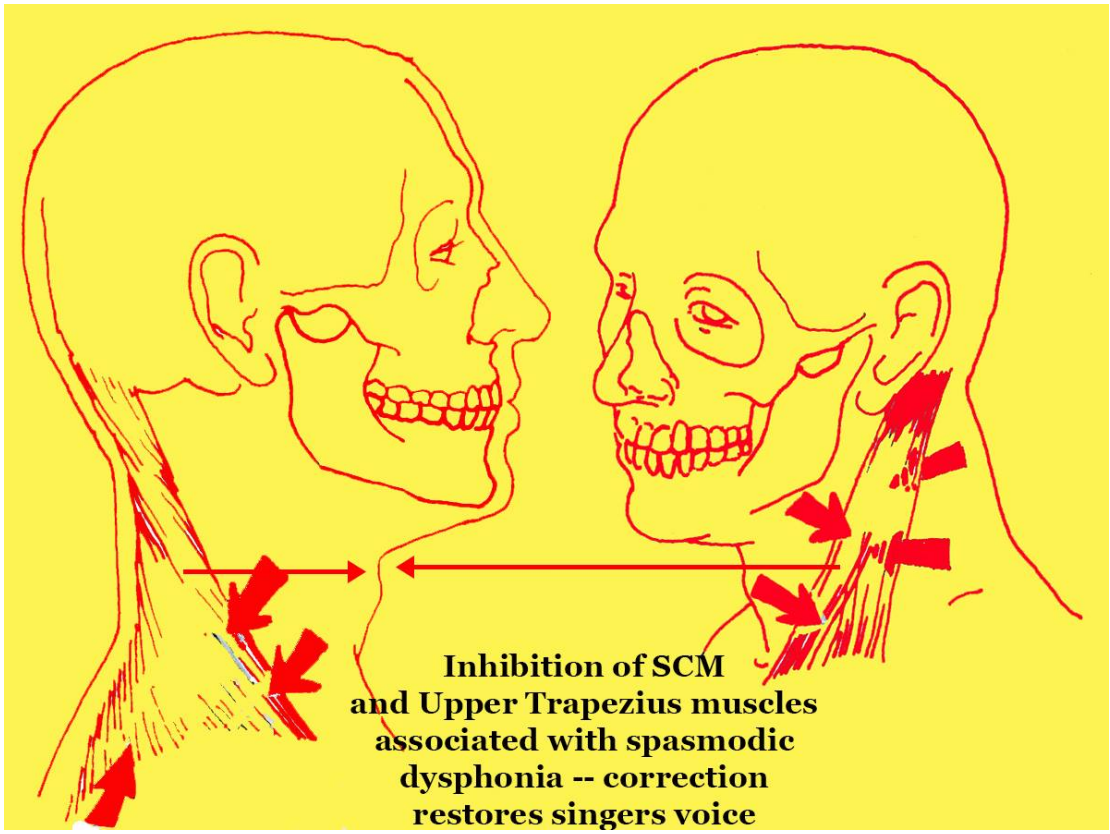


Figure 5: Inhibition of SCM & *Upper Trapezius* giving spasmodic dysphonia



TMJ & OSA and snoring

The chiropractor will not be able to organise the stomatognathic system-which includes the cervical spine, muscles of the cervical and *hyoid* areas, cranial primary respiratory motion, and much more, if malocclusion is forcing cranial distortion, orofacial muscle dysfunction, and cranial nerve impairments.

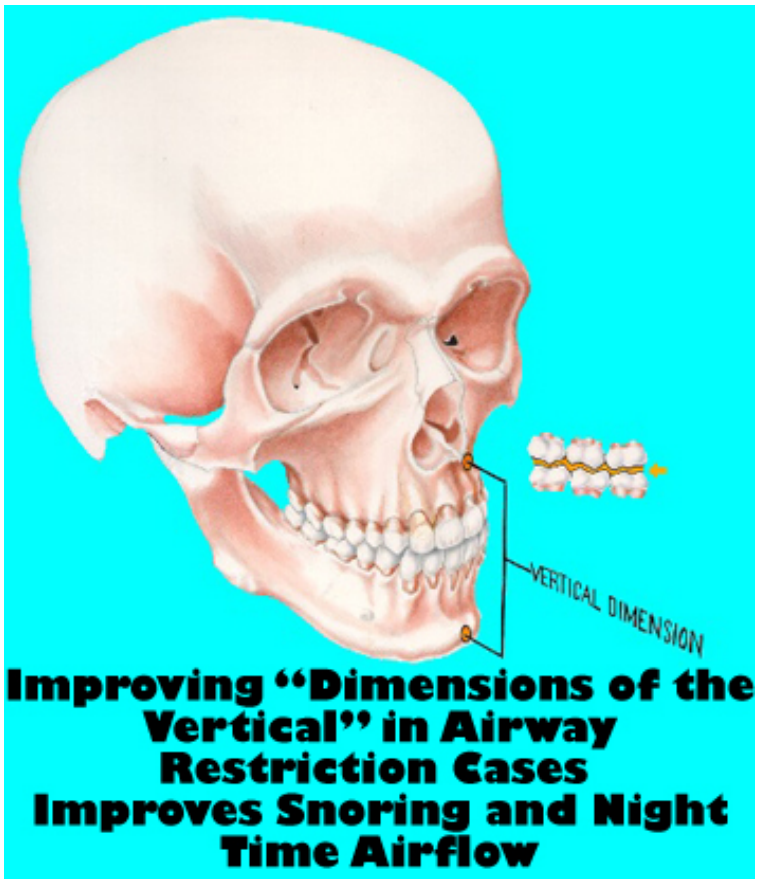
The symptoms that can develop are so wide ranging that it is impossible to discuss them in a short article. The patient may complain of low back pain, headaches, or digestive disturbance, as well as a myriad of other symptoms. Unfortunately, these patients tend to travel from doctor to doctor receiving only temporary, if any, relief from the condition.

We now know that a dentist is often involved with TMJ dysfunctions that have a pelvic disturbance as their basic cause. (3) It is well known that remote structural distortions can cause dysfunction of the mandibular muscles, which are part of the closed kinematic chain of muscles in the stomatognathic system. The jaw may also function in a different manner when the patient is lying down in bed compared to sitting and as opposed to standing.

From the Chiropractor's viewpoint, the optimum method for developing rapport with dentists, which results in improved inter-professional relationships, is consulting with the dentist regarding patients who require the services of both professions. Of course, it is necessary first for the Chiropractor to become an expert in the field of the stomatognathic system and learn dental terminology and understanding so that communication can ensue. The already established literature in applied kinesiology goes into greater detail and depth on the interactions of this all-important mechanism. (9, 10)

As the chiropractor becomes more knowledgeable in this area and begins to work with various dentists, knowledge of the stomatognathic system and its interrelation with the rest of the body begins to snowball. As communication between the two professions develops, the two way street of referrals also snowballs, helping many patients who previously were not being adequately treated to gain improved health. Not only do the patients benefit, but both professions do by eliminating the frustration of trying to treat patients who do not respond adequately to therapeutic endeavours.

Figure 6:'Dimensions of the vertical'



Discussion

> The relationship between the muscles of the soft-palate, tongue and throat deserve clinical assessment for anyone who snores or has stomatognathic system disturbances.

For patients with snoring and breathing disorders at night, Ramos de Luccas found that in the orofacial myofunctional assessment, there was a greater frequency of alterations in tongue tone; lip mobility; unilateral chewing patterns, with increased speed and chewing inefficiency. Swallowing with excessive contraction of the perioral muscles was present in these patients, associated with altered head movements and the presence of muscular dysfunctions in the oral cavity. (7)

Dysfunctions of these muscles can be diagnosed and corrected by Chiropractors, medical doctors, and massage therapists who understand these relationships. (8) Disorders of the temporomandibular joint, extensively discussed in previous articles in the Journal, (9) are also relevant in this situation in most of the patients I have examined who snore.

Correction of TMJ dysfunctions improves a large number of people afflicted with snoring. (11) Approximately 47% of the motor and sensory cortex of the brain is involved with muscles of the throat and jaw during breathing, chewing and swallowing. The relationship of the muscles of the jaw and throat and TMJ is of major importance in human health, especially related to breathing (snoring and sleep apnea) at night.

There are many over-the-counter and herbal remedies available around the world, which do not correct the causes cited above for snoring; but they do help temporarily improve the sounds our patients make at night occasionally in our experience. Nose strips and clips, menthol vapour to open a clogged nose, varieties of mouth and head gear prescribed by dentists (often for sleep apnea), and finally surgery, the most drastic and dangerous and expensive option are examples.

Sleeping on one's back can lead to snoring even in people not otherwise likely to snore, because it frequently results in the tongue dropping to the back of the mouth, or causes gravity to act on relaxed muscles by pulling them down, obstructing breathing.

> Remember, gravity plus weak muscles frequently equal a blocked airway.

The exercises cited at the beginning of this essay for the oral cavity will strengthen and oral cavity muscle function.

Gaining weight can increase our patient's chances of snoring. Adding fatty tissue around the throat is a frequent cause of snoring, and the more people tend to obesity, the more they snore. However, the troubles Chiropractors face making dramatic and near-immediate changes in our patients' weight loss hopes is a well-known conundrum in our profession.

A hereditary pattern may also be present of fatty tissue in the neck area which just makes it worse, and if patients are thin but notice a small pad of fat under their chin, or have a neck that is relatively large in circumference to begin with, patients should be double cautioned to avoid putting on weight if they wish to fend off snoring.

The author has known many patients who were formerly in the military who slept in rooms full of other people and find themselves in the unwanted company of someone who snores, who is often shocked to learn about the snoring. In such a circumstance, those annoyed by the snores are a captive audience, but the situation changes when the one annoyed is your chosen life partner. They often are the only one who suffers from the snoring, and when its sufficiently severe that it prompts her or him to seek someplace else to sleep at night, that is the point when many snorers begin to consider their habit as a problem and visit their chiropractor for assessment, treatment, and hopefully long-term correction.

Conclusion

Snoring is a common and distracting sound produced by many unhealthy people while they sleep.

It occurs when the upper airway narrows or collapses during sleep (a neuromuscular problem, diagnosable and treatable by Chiropractic science), causing tissues to vibrate and produce a noisy breathing sound.

It can be a harmless condition, but in some cases, it can be a sign of obstructive sleep apnea (OSA) and a very distracting problem for sleep-partners around the world.

This paper has offered approaches for Chiropractors to assess and help patients who snore.

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Cite: Cuthbert S. Snoring and Obstructive Sleep Apnea: A measurable neuromuscular ensemble of the Chiropractic patient's mouth and airway. Asia-Pac Chiropr J. 2025;6.1. www.apcj.net/papers-issue-6-1/#CuthbertSleepApnea

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He has served on the Board of Directors of the *International College of Applied Kinesiology USA*. Dr Cuthbert is the author of three textbooks on applied kinesiology (in addition to 15 *Index Medicus* and over 50 peer-reviewed research papers) on Chiropractic approaches to functional health problems. *Images courtesy of David S. Walther, DC, with permission.*

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