

Scott McCoy, Associate Editor

# Dispelling Vocal Myths. Part 2: “Sing It *Off* the Chords!”

Deirdre Michael



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**T**HIS IS THE SECOND IN A SERIES of articles aimed at clarifying misconceptions about vocal production that seem to be held in common by a wide variety of singers.<sup>1</sup> I call these misconceptions “myths,” because they seem so pervasive among singers (at least the singers I see in the clinic), and because they seem to have been learned implicitly rather than explicitly.

The process of dispelling these vocal myths seems similar to the process called “Body Mapping” (see, for example, an article by Malde in an earlier issue of this periodical).<sup>2</sup> In my clinical practice, dispelling myths is part of the natural educational component of functional voice/speech therapy; for the studio teacher, this process is simply part of the singing lesson. Regardless of what it is called, it is helpful for teachers to recognize that a student may be operating under some misconception about vocal production, and that dispelling the myth may prevent the student from fighting against his or her own anatomy.

A caveat may be useful here. Dispelling vocal myths does not mean that every voice lesson is an anatomy lesson, or that development of vocal technique requires a conscious attempt to control the mucosa and intrinsic muscles of the larynx. The use of imagery is a time honored method of teaching singing, and many useful images are actually at odds with physiologic reality. The problem is that some singers will confuse imagery with reality, and base their technique on a concept that was useful as an image, but dangerous as a core belief. This seems especially true with concepts that are formed early in the development of singing, and then followed subconsciously throughout the development of the mature technique. It may behoove us, as singing teachers, to differentiate between images and physiologic reality, so that our students use their images more appropriately.

## **MYTH #1: VOCAL FOLDS ARE “CHORDS”**

For this installment, let us explore myths having to do with the vibratory source of the voice, that is, the vocal folds. I hope you caught two myths in the title. The easy one to spot is the spelling of the word “chords.” I’m surprised how many well educated singers e-mail me about their “vocal chords.” This is easy to clarify with a little basic anatomy. (The other myth in the title is singing “off” the cords—more on that later.)

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### **Truth #1: Vocal folds provide the vibratory source for singing**

The larynx is the structure known in layman's terms as the voice box, and it really is like a little box of cartilage, sitting on top of the trachea (windpipe). The larynx is the housing for the vocal folds. When viewed from above, as with a laryngeal mirror or endoscope, the vocal folds appear to be two white bands. Long ago it was assumed they vibrated much like strings; hence the term vocal "cords," which is still in pervasive use today. ("Chords" is an understandable misspelling perpetrated by musicians.) However, we now know that the vocal folds are not free floating strings, but are multilayered structures that protrude from the sides of the thyroid cartilage. One of the layers, the vocal ligament, is continuous with the conus elasticus, a ligament that lines the upper airway. Thus, the folds are anchored on the sides, but extend into the airway so that they are free to vibrate. Simply stated, the vocal folds are composed of a muscle that runs the length of the folds from front to back, which is covered by a multilayered sheath of mucosa. For the most part, it is the mucosa that vibrates, in a fashion that is more complex than simple strings or cords, making vocal "folds" the more appropriate term. By the way, the space between the vocal folds is known as the glottis, so that anything having to do with vocal fold vibration may be referred to as "glottic" or "glottal."

Human vocal folds are so elegant, and so interesting. The purpose of this series of articles is to provide some simple ways of dispelling vocal myths within your studio, so I won't elaborate much here; but I do urge you to learn more about the vocal folds. For descriptions of the anatomy and physiology of the larynx, there are many excellent books within the genre of voice pedagogy texts that are probably familiar to most readers. Additionally I suggest a wonderful, relatively new offering from the speech-pathology world, written by Dr. Alison Behrman.<sup>3</sup>

In the meantime, there's no real problem if singers affectionately refer to their vocal folds as their "cords" (just like violinists refer to their "fiddles"). But we may be better served by referring to them as folds, as a subtle reminder of the complex vibration of the mucosa, with the underlying muscular activity.

**Related Megamyth: The more you know about the anatomy and physiology of the vocal mechanism, the more mechanistically, and less artistically, you'll sing.**

This myth has been soundly disproven by legions of superb singers who have excellent understanding of their own mechanism. I guarantee you, when they're singing, these artists are thinking about musical expression of the text, not their muscles or the acoustics of the vocal tract. But they base their practice on smart, efficient use of the entire vocal mechanism. Scores of my patients would have been spared vocal injury if they had learned to practice in accordance with actual physiological properties of their voice.

### **MYTH #2: YOU CAN SING "ON" OR "OFF" THE CORDS**

This is one of those images that works well for some singers, and gets others into trouble. The problem is that if singers use this image, they may try to feel their vocal folds, and this is dangerous.

### **Truth #2: You don't feel your vocal folds vibrate**

If you are singing or talking, that is, if you're phonating (producing a sound with your voice), the vocal folds are vibrating. You don't feel them vibrate, any more than you feel your other organs at work. You would tickle yourself to death if you were aware your vocal folds vibrating. You also don't feel the intrinsic laryngeal muscles contracting. You know this about the rest of your body as well: you are protected from sensing normal biological processes, and have mechanisms for heightened sensory awareness if something goes wrong. Understanding the biological purposes of the vocal folds may help shed some light on what you can, can't, and shouldn't feel when singing.

### **Biological purposes of the vocal folds**

The primary biological purpose of the vocal folds is to protect the lungs. In terms of sensation, the vocal folds ignore the air going past them in and out of the lungs, and they ignore vibration. But if any food, liquid, or foreign object comes near them, the vocal folds will adduct (come together) very quickly, to prevent the food or liquid from coming into the airway. Also, the epiglottis folds over the vocal folds, for additional protection.

However, if you accidentally inhale a particle (a popcorn hull, for example), the vocal folds sense the invasion of the airway, and they will cough and cough until the hull is expelled and the airway is safe. We share the biological functions of the larynx and vocal folds with all other air-breathing animals. The fact that our vocal fold mucosa has evolved into the complex layered structure that provides for the richness of our phonatory system is one of the perks of being human. Still, the biological purpose of the vocal folds trumps any overlaid function such as singing or talking. You cannot talk, much less sing an aria, while your vocal folds are busy expelling the popcorn hull.

By the way, you will have very keen sensation of the popcorn hull itself. After a few moments of coughing, you will also sense the irritation of the mucosal structures. However, it is possible to have lesions (growths) on the vocal folds, such as nodules or a polyp, and have no sensation of the actual lesion. Sometimes I wish that nodules would hurt, to remind my patients to reduce their voice use!

The secondary biological purpose of the vocal folds is to seal off the airway, to trap air in the lungs. This provides what is known as thoracic fixation, which gives you stability or “backpressure” for excretion, childbirth, heavy lifting, and other such activities. Try starting a grunt, and hold the air back with your vocal folds: this is known as the “Valsalva maneuver.” You can sense the air pressure below your vocal folds, known as subglottic pressure, and you can sense the resistance of the vocal folds to that pressure, known as glottic resistance. This can become a problem for singers, if they feel the need to sense their glottis, or vocal folds, while singing. They may actually be sensing subglottic pressure and glottic resistance, and this goes beyond what singing requires.

### **Truth #3: Singing is easier than childbirth.**

It appears obvious that singing is also easier than defecation and heavy lifting. In fact, singing requires only a tiny fraction of the pressures generated for the biological purposes of the larynx.

### **Subglottic pressure required for phonation**

One of the ways of measuring subglottic pressure is in centimeters of water or air, abbreviated cm H<sub>2</sub>O. Imagine a tube or beaker, calibrated in centimeters, and par-

tially filled with water. If you could insert a straw into the bottom of the beaker and blow into it, your air would lift the column of water some number of centimeters. Lung pressure, or subglottic pressure, can be measured in cm H<sub>2</sub>O.<sup>4</sup>

The Valsalva maneuver requires about 150 cm H<sub>2</sub>O. Very loud singing has been measured at 60 cm H<sub>2</sub>O—less than half of the Valsalva maneuver! Even more remarkably, conversational speech is maintained at approximately 3–4 cm H<sub>2</sub>O. Consider that there is a great deal of singing that does not require more pressure than conversational speech.

Phonation threshold pressure is the amount of pressure that is required merely to set the vocal folds into vibration. It is typically calculated from indirect pressure measurements that are made at the lips. Phonation threshold pressure will depend upon a variety of factors such as viscosity of the vocal fold mucosa. (Well hydrated, slippery vocal folds will be set into vibration more easily than dry, sticky ones.) Still, research shows that phonation threshold pressure is in the area of 3–7 cm H<sub>2</sub>O. At the onset of this phonation, sympathetic vibrations will be felt in the mouth or perhaps the throat, but there should be no sensation remotely approximating that of the Valsalva maneuver.

It seems natural that the rich sensory feedback we receive from vibrations as we sing is important in the development of our technique. My clinical experience suggests that many singers try to maintain sensory awareness of their glottis, in an attempt to feel and control their singing. I suspect this is the origin of the notion of singing “on or off the cords.” It is doubtful that singers actually believe they are singing with or without their vocal folds; rather, they are gauging their singing by how much subglottic pressure and glottic resistance they feel, without realizing that feeling any sensation of vocal folds is probably too much. This can lead to the development of hyperfunction that can eventually lead to damage to the vocal fold mucosa, or muscular injury.

### **Ventricular folds**

Another source of sensation at the glottis that could be perceived as singing “on or off the cords” might be the constriction of the ventricular folds. The ventricular folds are folds of tissue that extend out from the cartilage, much like the vocal folds. They are above the vocal folds,

and are often referred to as the “false” or “vestibular” vocal cords. There is a space between the vocal folds and the ventricular folds known as the ventricle. (In anatomic terms, a ventricle is an empty space or cavity.) During phonation the ventricular folds are retracted and allow the true vocal folds to vibrate freely. The ventricular folds squeeze together tightly to help with airway protection, or valving of the airway for thoracic fixation. At times, though, the ventricular folds may approximate or constrict during phonation. The muscular source for this is not well understood, but extrinsic laryngeal muscles (muscles of the neck, outside the larynx) are most likely involved. Ventricular approximation or “squeeze” can be learned and controlled by singers or speakers, for a variety of effects, depending on the degree of approximation. This squeezing can be sensed, and it may actually be the variable when singers believe they are singing “on or off the cords.” Ventricular approximation may also be part of the clinical picture in a variety of vocal pathologies. Excessive constriction of the ventricular folds can inhibit vocal fold vibration and greatly alter voice quality. In extreme cases the ventricular folds can actually become the vibratory source, completely damping the true vocal folds. Because of the neck muscle involvement, ventricular approximation can be very fatiguing, and certainly the effort to try to maintain vocal fold vibration in the presence of the damping effect can be fatiguing and uncomfortable. Ventricular squeeze

can become habitual, and the habit can be notoriously difficult to break. Therefore, I worry that when singers describe themselves as singing “on or off the cords,” they may be constricting the ventricular folds in a way that could eventually become problematic for them, as they habituate to increasing levels of effort during singing. While some singers can learn exquisite control of their ventricular folds for a variety of vocal effects, others will buckle under the strain.

#### **Related Minimyths: Falsetto register is produced with the false vocal folds**

Male falsetto is a product of true vocal fold vibration. The folds are elongated and thinned, in a manner that is almost identical to head voice production in women. There actually is nothing “false” about it.

To summarize, the notion of singing on or off the cords may be a useful image for some singers, and may be a dangerous technical myth for others. A singer who believes it is necessary to sense the vocal folds as they vibrate may be creating glottic resistance that is more appropriate for biological functions than for singing, or may be recruiting neck muscles for ventricular approximation that may eventually become fatiguing and inhibitory to true vocal fold vibration. This is not to say that good singing doesn’t sometimes feel like a tremendously energetic activity, but sensation of pressure at the glottis should not be part of the energy. Understanding



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the efficiency of the phonatory system can be helpful in preventing or resolving technique problems in singers.

### NOTES

1. Deirdre Michael, "Dispelling Vocal Myths. Part 1: 'Sing From Your Diaphragm!'" *Journal of Singing* 66, no. 5 (May/June 2010): 547–551.
2. Melissa Malde, "Mapping the Structures of Resonance," *Journal of Singing* 65, no. 5 (May/June 2009): 521–529.
3. Alison Behrman, *Speech and Voice Science* (San Diego, CA: Plural Publishing, 2007).
4. A much more comprehensive explanation of this is provided in the classic, Ingo R. Titze, *Principles of Voice Production* (Englewood Cliffs, NJ: Prentice Hall, 1994). Please don't be afraid of that book. Yes, it has algebraic formulas, but it's much more readable than you think.

**Deirdre D. ("D.D.") Michael** is an assistant professor in the Department of Otolaryngology in the University of Minnesota Medical School. There she is codirector of the Lions Voice Clinic, where she treats patients with voice and airway disorders, and directs the treatment, educational, and research activities. She specializes in treating singers, actors, music teachers, and other professional voice users. She is also a frequent lecturer and collaborator in the Department of Speech, Language, Hearing Science, and in the School of Music.

Dr. Michael received a BA in music and psychology from Hamline University in St. Paul, MN, MA in Speech-Language Pathology, and PhD in Communication Disorders, with a specialization in voice science, from the University of Minnesota. She has been a voice and piano teacher for thirty years, and a speech-language pathologist since 1991. She is a frequent presenter at national and international conferences for voice and singing science, most especially the Annual Symposium: Care of the Professional Voice sponsored by the Voice Foundation, and the biannual International Conference on the Physiology and Acoustics of Singing. She also lectures regularly at colleges around Minnesota and Wisconsin, in the areas of voice science, vocal health, and voice treatment. Her educational goals are to make voice science accessible to singers, and to educate medical residents on voice disorders and the special needs of singers. She serves NATS locally as a collaborator and adjudicator, and nationally, making appearances in workshops and conferences in 1997, 2000, 2006, and in the 2009 Winter Workshop in Miami. She serves of the Scientific Advisory Board of NATS, and will give a presentation on voice disorders in singers at the National Conference in 2010 in Salt Lake City. Her areas of research and publication include perceptual characteristics of voice, acoustic measures of voice quality, and various aspects of normal and abnormal speech and singing production.

Dr. Michael maintains a lively private voice and piano studio, and is active in a variety of local teaching and music organizations. Her most recent project has been to revamp the singing critique forms for the Minnesota Federation of Music Clubs Junior Festivals. A soubrette soprano, she continues to sing in a variety of musical styles and venues.



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