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Dispelling Vocal Myths. Part 1: “Sing From Your Diaphragm!”

Deirdre Michael



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THE PREVALENCE OF VOCAL MYTHS

IN MY EIGHTEEN YEARS OF treating singers with voice disorders in a voice specialty clinic, hundreds of them have presented with some kind of problem with their singing technique. These technical problems might be a primary cause of their disorder, or may have developed as compensation for that disorder. It could even be a long-standing and otherwise unrelated problem with technique that gets in the way when we're trying to address the voice disorder. Over the years, I have come to realize that many of these problems develop because these singers are operating under misconceptions about vocal technique, or about their vocal mechanism. Of course, they're not aware of their own misconceptions; when given explanations of the true anatomy and physiology, they generally find it much easier to correct their technical problems, to address their voice disorders, and to sing in general.

I call these misconceptions “myths,” because it seems that many have been handed down from generation to generation with no question about their veracity. Most often they weren't learned explicitly, in books or coursework, or even from their teachers, but rather acquired implicitly from sources the singer had no reason to mistrust. As teachers of singing, it is important for us to recognize that we are neither the first nor only source of information for our students; by the time they are in high school, they already may have acquired a wealth of information and misinformation about their voices. They may not be able to act on our technical guidance if it is at odds with some myth they harbor beneath the level of consciousness.

The purpose of this series of articles is to relate the myths I see most commonly in the clinic, and to provide facts that can clarify them and thus help to improve technique. These facts can be found in many excellent books and articles about the anatomic and physiologic basis for singing; I'll suggest some along the way. I present them here as simple tidbits of information that can be used to dispel a myth quickly within the context of a singing lesson.

BREATHING MYTHS

We begin with some of the most common breathing myths. Several decades of research by Dr. Thomas Hixon and his colleagues have demonstrated that many singers, including highly trained, successful performers, do not actu-

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ally breathe in the way that they perceive.¹ In the clinic, I see many singers unaware of how much excess energy they are expending on breathing. When asked about their understanding of breathing for singing, they parrot phrases they have heard (e.g., “we should breathe with our diaphragm”), but admit to confusion about the actual mechanics of breathing.

INHALATION MYTHS

Inhalation Myth #1: We need to *feel* the air.

One of the technical problems I see most commonly is found in singers who take a low, relaxed, abdominal breath, and then, right before phonation, lift their chests with a little gasp, contract their neck muscles, and hold their breath for a tiny moment just before they sing. This maneuver seems to create laryngeal tension and excessive valving of the air stream, thus reducing the ease of production and freedom of tone. Also, the little gasp means the vocal folds have been drawn together slightly, which increases the velocity of the inhaled air (remember the Bernoulli principle), and dries the vocal fold mucosa. When I redirect them to allow a relaxed inhalation, and simply initiate phonation without the prephonatory gasp, they say, “But I’m not getting any air.” It seems they’ve learned to interpret this sensation as getting air in; they believe they need to feel it. Despite the fact that they recognize the greater ease of production and freedom of tone when they initiate phonation without this gasp, the sensation seems to be quite gratifying. Singers like feedback; that is, they like to feel their own vocal mechanism at work.

We will cover sensory reception of the entire vocal mechanism in a future column. For the purposes of this discussion, it is important to note that we do not have any kinesthetic sensation of the diaphragm contracting, or of the air moving in and out the lungs. We do, however, have proprioceptive sensation of the rib cage expanding, and the displacement of the abdominal contents. We also have sensation of the various pressure differentials throughout the respiratory system. But unless that air is very cold, hot, or toxic, we have no sensation of the air moving between the vocal folds during quiet breathing, speech, or singing. However, if we increase the velocity of the air, we can feel that slight drying effect, so we think, “Aha! I’m breathing.” It is unclear to me

whether the singers who engage in this prephonatory “extra inhalation” are responding to the sensation of air movement through the glottis or mouth, to the contraction sensation of the clavicular and strap (neck) muscles, or some other sensation. Regardless of what subconscious need motivates them, singers are helped by learning that with a good inhalation, there should be a sensation of expansion of the abdominal and thoracic area, but no noticeable sensation in the upper chest or neck. There also should be no sensation of inhalation within the larynx. The sensation of air movement within the mouth is so normal that it is ignored.

Inhalation Myth #2: We need to work to get the air in; we need to inhale against a resistance.

This is actually more common than Myth #1, and seems to be quite pervasive. Singers believe that the abdominal musculature needs to be contracted and firm at all times—that the abdominal musculature provides some resistance to the inhalation. They may believe that inhalation should be very relaxed, but what they actually do is create a resistance with the abdominal muscles, and inhale against it. This may be another example of wanting sensory feedback; they are subconsciously trying to feel the work and the control of inhalation.

Inhalation Myth #3: The air pushes the diaphragm down.

I don’t encounter this myth as often as I did a decade ago, but it can certainly lead to a sensation of resistance, as the singer tries to feel the air pushing down on the diaphragm (which, remember, cannot be felt).

Inhalation Myth #4: Lungs fill upwards.

This little myth seems to be a concept we learn very early in life. When we’re three years old and go to the doctor, he says, “Take a big deep breath!” and he lifts up his shoulders to show us how. I see this myth mostly with younger or untrained singers who raise their clavicles and shoulders to breathe. Of course, we know this creates a high breath with excess muscular tension that can radiate to the laryngeal muscles. When I tell singers that the lungs fill down and out, they acknowledge that this makes perfect sense. When they act on this revised concept, they report that breathing suddenly gets much easier, and tone improves.

Mechanics of Inhalation, Made Simple

Here's an easy way to describe inhalation: The abdominal muscles relax, which allows the abdominal viscera to be displaced, which allows for the contraction of the diaphragm, which creates an air pressure differential between the lungs and the outside air, and the air is sucked into the lungs. The lungs fill down into the rib cage.

One of the most simple, common, and facilitating things I do with struggling singers in the clinic is to show them that abdominal relaxation should *precede* the inhalation. When I teach them a quick release of the abdominal musculature, they're amazed at the increased ease of inhaling and of singing.

Let's add a bit more detail. Inhalation is an active process, controlled by a voluntary/involuntary mechanism, so it doesn't require cognition, but can be volitionally controlled. The most important muscle of inhalation is the dome shaped diaphragm, which sits inside the rib cage. You don't have sensory perception of it, and you can't palpate it. When the diaphragm contracts, it flattens and expands outward, increasing in circumference. This lowers the floor of the rib cage, as well as increasing the lower circumference. The lungs are coupled to the rib cage by the two pleural membranes. They are like two pieces of wet plastic wrap that cling to each other, one on the outside of the lungs, and one on the inside of the rib cage; therefore, if the rib cage expands, the lungs have to expand. When they expand, the air pressure inside drops, because there are the same number of air molecules, now in a larger space. (This is Boyle's law; you may have heard of it, but you were afraid of it—actually, you learned it in eighth grade science.) Air pressure outside the lungs is now greater than the air pressure inside the lungs, and the air rushes in to equalize it. As long as there is no resistance to the lowering of the diaphragm, this equalization of air pressure can be really fast, which is why those abdominal contents need to get out of the way.

We can also expand the rib cage (and thus bring air into the lungs) by contracting clavicular muscles, which requires neck muscle involvement and usually creates undue tension. With a very short inhalation, however, the clavicular muscles often are faster, so there is a little movement of the chest. Also, the vocal folds don't actually come apart completely, so there might be a little inhalation noise. Don't worry about that—it's hard to

avoid, is not harmful, and is very common during speech. On the other hand, repeated high, clavicular breaths in singing can lead to tension and dryness, which is why long, fast melismatic passages are so problematic. It is difficult to get a deep, relaxed, moisturizing breath when you have only a sixteenth of a beat to do it.

EXHALATION MYTHS

Exhalation Myth #1: The diaphragm inhales and exhales.

This seems to be one of the most common of all singing myths. A few weeks ago a patient of mine told me that half of his diaphragm did not work, which requires him to contract his abdominal muscles very strongly with every exhalation to compensate for this impairment. When I said, "But, your diaphragm only inhales for you, it doesn't exhale," he stared at me for a moment, and then said, "I did know that." His cognitive understanding of anatomy had never directly challenged the subconscious myth. This is a classic story in the clinic. Motivated young singers base their breathing technique on the belief that they need to help their diaphragm exhale, and that the muscular activity they feel is their diaphragm working. They might even believe the rectus abdominus *is* the diaphragm. It seems likely that someone early in their singing life told them to "Sing from your diaphragm!" and they sincerely try to do just that.

Exhalation Myth #2: Abdominal muscles push the air out.

Another pervasive myth, at least among singers I see in clinic, is that the abdominal muscles must be strongly contracted with every phrase they sing, as if they were doing a sit-up. Some people do this in speech as well, but many are relaxed with exhalation when they talk, but demonstrate Olympian exertion for singing a simple five-note phrase.

Mechanics of Exhalation, Made Simple

Once we've inhaled, the lungs are inflated (like a collection of tiny balloons) and air pressure is equalized. The oxygen goes out to the rest of the body through the blood stream, and the carbon dioxide is exhaled from the lungs. In at-rest breathing, which is known as tidal breathing, this exhalation of the CO₂ is *passive*. No brain or mus-

cular activity is required. The lungs are highly elastic, like little balloons, and they simply deflate. The diaphragm is also highly elastic, and simply recoils. In tidal breathing, inhalation and exhalation take approximately the same amount of time, about two to three seconds for each part of the cycle (exhalation is usually slightly longer, and there is a slight pause at the end of the exhalation). For speech breathing, inhalation is shortened slightly, and exhalation is lengthened. To extend the exhalation, the abdominal muscles provide a gentle checking action to the elastic recoil of the diaphragm. Instead of just returning to their nondistended state, as they do in tidal breathing, they contract very slightly and hold outward, which keeps the diaphragm from recoiling upward. This slow recoil of the diaphragm permits air to be released more slowly. We all started learning this checking action of the abdominal musculature when we were six months old and began to babble. We experimented with our respiratory/phonatory mechanism, and by the time we were two years old, we were very good at the checking action of the abdominal muscles. And we never felt it! At a young age we learned to extend that a bit for singing, and we still didn't know that we could maintain exquisite control over the recoil of the diaphragm without ever feeling it. There is also exquisite control of the release of air at the level of the vocal folds, and we can't feel that either (more of that in another article).

The release of breath in singing is accomplished through the checking action of the abdominal muscles, and the subtle, highly trained coordination of all the respiratory and phonatory musculature. For extended phrases, we need to increase the checking action at first, and eventually contract abdominal muscles to put pressure on the diaphragm and lungs to move the remaining air out of the lungs and keep the vocal folds vibrating. That fine coordination of all the expiratory muscles requires a great deal of training. But many singers use too much muscular effort during all the levels of expiration, and try too hard to feel sensations that cannot or do not need to be felt.

I see two common technical problems arising from not understanding the passive nature of exhalation. First are the singers who feel the need to hold their breath before singing, and essentially hold their breath (excess glottic resistance to the air stream) during the entire phrase. They interpret their out-of-breath feeling as not having enough air, when actually they're just not releasing the air in the

lungs. These singers often will explode air at the end of every phrase, and still not be aware they were valving the air steam too tightly. Remember that once the oxygen has gone out into the blood stream, the lungs are eager to get rid of the residual CO₂. We know that sensation if we've ever gone under water without blowing bubbles—we feel as if we are going to explode. In speech, the air is released in such a way that we never feel the need to explode. Much of singing can be the same, and the rest requires training of the coordinated effort. It should not feel like going under water without blowing bubbles.

The other common technical problem is in singers who believe that they're in charge of pushing the air out of the lungs, using their abdominal muscles, from the very beginning of a phrase. Those are the singers who were told to "support that tone!" This brings me to what may be the most dangerous myth of all.

Exhalation Myth #3: The great panacea is breath support.

I treat singers, especially young ones, who are working so hard to sing, but everyone in their vocal education keeps saying: "The problem is you need to support that tone—you need better support." In their attempt to feel the support, they force air out of the lungs with their abdominal muscles, and resist the air pressure with their vocal folds, creating an overly tight valve at the glottis. The poor singers are working as hard as they possibly can, and all that "support" is ruining their vocal technique, and compromising the voice.

Because we cannot directly sense the "working parts" of the vocal mechanism, the use of imagery in the teaching of singing is necessary. The image of breath supporting the tone is a time-honored image and works well for many students, but other students will take the image too far. I recommend that we explain the mechanics of singing, however briefly and simply, to our students. We then should remind them frequently that what happens in singing is not sensed accurately, so it might be best to rely on images that have nothing to do with the singing mechanism itself. It's my hope that this will prevent the creation of misconceptions that will backfire later.

NOTE

[Research on respiratory kinematics by Tom Hixon and his colleagues from the early 70s to the late 90s is excellent and fascinating.

It toppled our ivory towers when results undermined dearly held beliefs about how we breathe. Much of the research was published in the *Journal of Speech and Hearing Research* (JSHR), later the *Journal of Speech, Language, and Hearing Research* (JSLHR). As an amalgamation of those various research articles, Hixon wrote an excellent primer on breathing for singers; both practical and readable, it demonstrates that the author understands singers.]

1. Thomas J. Hixon, *Respiratory Function in Singing: A Primer for Singers and Singing Teachers* (Tucson, AZ: Redington Brown LLC, 2006).

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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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