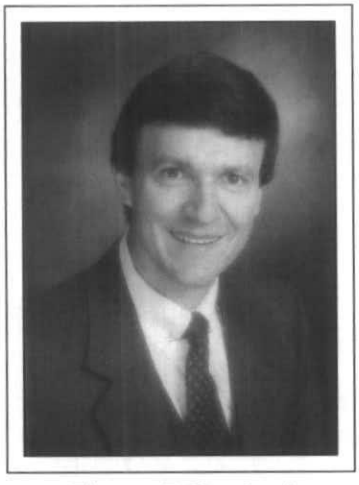
Constructing Exercises that Enhance the Management of the Interdependence of the Vocal Folds and Breath Management in Singing



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A typical tutorial on voice divides the essential elements of voice production into three separate categories: power supply, vibrator, and resonator. Though the three elements are frequently presented as independent entities, one cannot actually occur without the other. For example, as breath management depends on vocal fold resistance, good singing cannot occur without the interaction of the folds and the breathing mechanism.

The crucial interdependence of breath power and vocal fold approximation can be demonstrated in several disease processes and physical conditions. For instance, someone may have healthy vocal folds but is unable to produce a good sound because of an inability to get air out of the lungs, such as in emphysema. On the other hand, someone may have excellent lung power but have a poor voice as a result of inadequate glottal closure, such as is seen in the patient with bowed vocal folds.

Singing in the classical style requires a highly refined ability not only to change breath pressure in the lungs, but also to control vocal fold stiffness and closure. Because the coordination of vocal fold resistance with subglottal pressure is so crucial to the sound, exercises that demand attention to the refinement of these essential elements must be mastered.

Before considering some exercises that might enhance the singer's ability to control these dynamic elements of voice production, a review of the mechanics of the most basic tasks in singing is appropriate. The essential tasks involved in singing at the vocal fold level are to change pitch, alter loudness, and create varying degrees of efficiency. Essentially, pitch changes are the result of vocal fold stiffness. There may be other ways to stiffen the vocal folds, but the two chief methods described in the literature today are (1) stretching the folds by bringing the thyroid and cricoid cartilages closer together, and (2) contracting the thyroarytenoid muscle itself. In essence, as the vocal folds get stiffer, the pitch rises, and, as the stiffness is lessened, the pitch is lowered. Even these two pitch changing mechanisms should be interdependent. Loudness is essentially a product of subglottal pressure and glottal closure. As a rule, when subglottal pressure rises, loudness is increased, and vice versa. Glottal efficiency is dependent on glottal closure and subglottal pressure, and glottal closure is the highly refined movement of the vocal folds toward each other. Even though pitch, loudness, and efficiency may appear to be independently managed, there is a great deal of interaction. Here are some examples. Even though pitch changing is chiefly dependent on vocal fold stiffness, a small change in pitch can be produced by an elevation in subglottal pressure. In addition, stiffness of the vocal folds demands more subglottal pressure to drive the more resistant vocal folds. Consequently, if while raising the subglottal pressure the loudness needs to remain the same, certain other adjustments must be made, including alteration in the approximation of the folds. Globally, three main gestures are at the singer's disposal to alter the sound at the laryngeal level: changing vocal fold stiffness, varying subglottal pressure, and altering vocal fold approximation.

Below are three examples of vocal exercises and some of the possible mechanisms involved in creating the desired output from that exercise:

1. ***Messa di voce.*** The *messa di voce* is a gradual crescendo followed by a decrescendo on a sustained tone. To accomplish the *messa di voce*, the vocal folds must adapt to an increase of subglottal pressure that creates loudness while not allowing the pressure increase to change the pitch. The exercise requires refined coordination between vocal fold stiffening mechanisms, approximation, and subglottal pressure.
2. ***Staccato***. Staccato reduces the duration of a briefly sung tone, so that much of the note value is silence. Mechanically, this requires the coordination of the breathing system and resisting folds to create a subglottal pressure sufficient to produce a certain tone with loudness and pitch, and then reduce the subglottal pressure to below phonation threshold (the minimal pressure needed to produce a tone). In addition, if the loudness of the tone remains the same for several staccato notes, vocal fold stiffness, approximation, and subglottal pressure must be coordinated.
3. ***Sustaining long phrases.*** As William Vennard said, "Probably breath control depends on resisting the tendency of the ribs to collapse as long as possible." Sustaining long phrases should help the singer learn a fine coordination of the passive and active forces in breath control.

Every singing exercise needs a purpose and should be tailored to the needs of the singer. If the singer's problems relate to the onset of the sound, then exercises that enhance vocal fold approximation as well as the delivery of the breath to the folds should be employed. If the problems relate to pitch change, then exercises that demand systematic stiffening of the folds should be utilized. Problems of loudness need the consideration of both approximation and subglottal pressure.

In every case, it is a good idea for the teacher to make sure that he or she is working with healthy vocal folds. This may require the cooperation of the teacher with an otolaryngologist who uses stroboscopy in his practice. A stroboscopic examination can give the teacher some assurance that the student appears to possess an instrument that can be expected to perform normal singing tasks.

Having a better understanding of the interdependence of the various aspects of tone production is beneficial for a teacher to construct efficient exercises for a singer. This knowledge can help a singing teacher employ exercises that are more specifically directed toward the improvement of a singer's expertise.

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