

# Voice Science in the Choral Rehearsal: Examining Glottal Onset

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The word *attack* is a most unfortunate choice to describe the initiation of any kind of artistic singing activity. Conjuring images of violence, tension, and stress, it is no surprise that “glottal attack” is a despised—if not dirty—phrase among choral directors. Prominent nineteenth-century voice teacher Manuel Garcia’s technique called the *coup de la glotte*, or “stroke of the glottis,” similarly evokes ideas of war and aggression, and like the glottal attack, it has been the subject of considerable controversy. The two concepts, glottal attack and *coup de la glotte*, have been mistakenly considered synonymous. Sadly, it has throughout history evoked a similar firestorm of controversial sentiment and has been considered by some to be synonymous with “glottal attack.” Arguments opposing any kind of glottal onset frequently center on their supposed harm to the vocal mechanism. Because glottal attacks are violent and damaging to the voice, the reasoning goes, it is necessary to avoid them in order to maintain vocal health. As choral directors for whom the vocal health of our singers is of paramount concern, we generally stay away from glottal onsets, faithfully teaching softer aspirate onsets, using a “silent *b*” or some other device.

Is the glottal onset really so injurious? Manuel Garcia was arguably one of the greatest teachers of singing in the nineteenth century, and the list of those who followed him includes Blanche Marchesi, Francesco and Giovanni Lamperti, Julius Stockhausen, Carlo Bassini, Charles Bataille, Edmund Meyer, and

William Shakespeare, all elite singers and voice teachers, and all of whom agreed with and advocated the practice of the *coup de la glotte*.<sup>1</sup> It seems improbable that a technique so harmful and ruinous to the voice would be so strongly advocated by so many great singers and teachers for such a long period of time. There must have been a very compelling reason for Garcia and the others to have advocated a glottal onset, and perhaps there has been a misunderstanding of Garcia’s own instructions regarding the *coup de la glotte* itself. Upon closer examination of the voice science related to the issue as well as a survey of the pedagogical literature from the nineteenth and twentieth centuries, it becomes clear that not only has the *coup de la glotte* been misunderstood by its critics both past and present, but its correct use can actually aid singers in achieving a clear, brilliant, and beautiful tone without any damaging effect on the voice. Perhaps if we as choral directors fully

<sup>1</sup> Stephen F. Austin, “The Attack on the *coup de la glotte*,” *Journal of Singing* 61, no. 5 (May/June 2005): 527.

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understood the principles of Garcia's *coup de la glotte*, and could differentiate between it and a harmful hard glottal attack, we would be able to employ it in our rehearsals to help train singers to achieve firm glottal closure and eliminate breathiness in their tone.

### *The Attack of the Glottal Plosive*

Most of our current negative opinion of the glottal attack began with laryngologists and speech therapists. Directly applying their warnings to the singing voice, pedagogues such as Barbara Doscher declare, "The glottal plosive is destructive, and may lead to vocal nodules."<sup>2</sup> However, a thorough search of the published research in this area reveals that empirical evidence of this destruction is scarce if extant at all, and as renowned speech pathologist Morton Cooper states, "the harmful effects of this type of vowel production have been assumed rather than researched."<sup>3</sup> In order to understand the apparent discrepancies of opinion in this matter, a clearer definition of the often overlapping terms "hard attack," "glottal plosive," "hard onset," "*coup de la glotte*," and "firm onset" must be sought. From the perspective of a laryngologist or speech therapist, a hard glottal attack is an indicator of unnecessary tension. Cooper elaborates:

A plosive type of vowel production indicates that the vocal cords are closed with unnecessary effort just prior to phonation and must be forced open with a strong burst of air. The plosive quality appears to stem from a tonic fixation of the folds preceding phonation, indicating laryngeal hyperfunction."<sup>4</sup>

Daniel Boone adds, "the abruptly starting phenomenon of hard glottal attack requires much unnecessary effort,"<sup>5</sup> and defines the hard glottal attack as "the slamming approximation of the vocal processes of the arytenoid cartilages."<sup>6</sup> It is important to note the use of phrases such as "unnecessary effort" and "laryngeal hyperfunction" within these definitions. A basic review of phonatory anatomy will lend more clarity to these definitions.

### *The Arytenoid Cartilages*

The physiological phenomenon we call singing could be considered quite unnatural.<sup>7</sup> At its most basic level, the human larynx, much like the larynges of all animals, serves the primary function of acting as a valve to protect the airway from foreign objects. Our highly evolved usage of this valve for speech is supplementary to this and other basic functions, and is nothing short of astonishing. Therefore it is important to note that all vocal sounds are produced by a process that involves, among other things, a rapidly recurring "slamming together" of the vocal folds as pressurized air passes between them. Singing is even more demanding than speech, considering that when we sing our vocal folds come into repeated contact at a very high frequency—approximately 262 times per second when singing C4 ("middle C") and as high as 1047 times per second for C6 (soprano "high C"). The characteristic sound of the hard glottal attack is not necessarily a result of the vocal folds slamming together; it is the result of another kind of process that begins with the complete closure of the laryngeal air valve and subsequent bursting apart of the vocal folds.

There are several sets of muscles in the larynx, but most important to this discussion

<sup>2</sup> Barbara Doscher, *The Functional Unity of the Singing Voice* (Metuchen, NJ: Scarecrow Press Inc., 1988), 61.

<sup>3</sup> Morton Cooper, *Approaches to Vocal Rehabilitation* (Springfield, IL: C.C. Thomas, 1977), 219.

<sup>4</sup> Ibid.

<sup>5</sup> Daniel R. Boone, *The Voice and Voice Therapy* (Englewood Cliffs, NJ: Prentice-Hall, 1977), 36.

<sup>6</sup> Ibid., 5.

<sup>7</sup> William Vennard, *Singing: The Mechanism and the Technic* (New York: Carl Fischer, Inc, 1967), 162.

are the interarytenoids (IA) and the lateral crico-arytenoids (LCA).<sup>8</sup> Both are attached to, and define the movement of, the arytenoids—the pyramid-shaped cartilages which are the posterior point of attachment for the vocal folds and are crucial to the closure of the larynx (see fig. 1.1). The synovial joint of the arytenoids allows them to rotate as well as slide together and apart. To initiate any kind of vocal phonation, the LCA muscles must contract, rotating the arytenoids and bringing the vocal folds together. However, this *medial compression* only partially closes the glottis (see fig. 1.2). In order to completely adduct the vocal folds, and eliminate the triangular shaped glottal “chink,” the IA muscles must bring the arytenoids together (see fig. 1.3). However, without the medial compression provided by the LCA, there is only loose glottal closure. Firm glottal closure requires both the action of the IA plus the medial compression of the LCA (see fig. 1.4).

The most dramatic example of complete glottal closure is known as the “Valsalva maneuver,” and is commonly utilized when engaging in strenuous muscular activity, such as lifting heavy objects or in childbirth. Taking a breath, completely closing the glottis, and engaging the expiratory muscles in the rib cage creates a buildup of high subglottal pressure that acts as a lever against which our abdominal muscles can work during these activities. Should the pressure become too great for the laryngeal muscles to resist, the vocal folds are quickly forced open and an audible “grunt” is heard. This is the sound of a very hard glottal attack. The relative “hardness” of a glottal attack is determined by the amount of tension in the muscles of the closed larynx, which is determined by the amount of subglottal pressure being resisted. It would be expected that the lower the subglottal pressure, the softer the “attack.” In contrast to the hard glottal attack, the normal glottal plosive is used in many spoken languages such as English and German and, due to the

low subglottal pressures and low muscular tension, is not likely to have any harmful effect.<sup>9</sup> Merely pronouncing the American phrase “uh-oh” requires a mild glottal plosive, as do several other spoken sounds.

In the realm of speech and voice therapy, the hard glottal attack is linked to several types of laryngeal dysfunction. While it would appear that the hard glottal attack is harmful, the glottal plosive of normal speech is not. (The term “onset” or “glottal onset” is specifically applied to singing and, as will be discussed below, warrants a different definition entirely, along with Garcia’s concept of the *coup de la glotte*.) The issue at hand is the muscle tension in the larynx, specifically in relation to the arytenoid cartilages, not in the glottal sound that is produced as a result. In singing, tension has a negative connotation and many teachers encourage singers to release all tension. However, as Friedrich Brodnitz points out, complete relaxation is a myth. All muscles, whether tensed or relaxed, have tonus—complete muscular relaxation only occurs in death.<sup>10</sup> These muscular tensions are to be balanced, though, and it is the control of tensions that results in good vocal function.<sup>11</sup> The issue, then, is not whether the presence of tension in the larynx is healthful or harmful; rather, it is the degree of tension that is in question. While a moderate amount of tension is necessary to balance the laryngeal muscles for speech and singing, an excessive amount of tension is unhealthy and damaging to the vocal mechanism and can lead to disorders such as nodules, cysts, and dysphonia.

### *Laryngeal Hyperfunction*

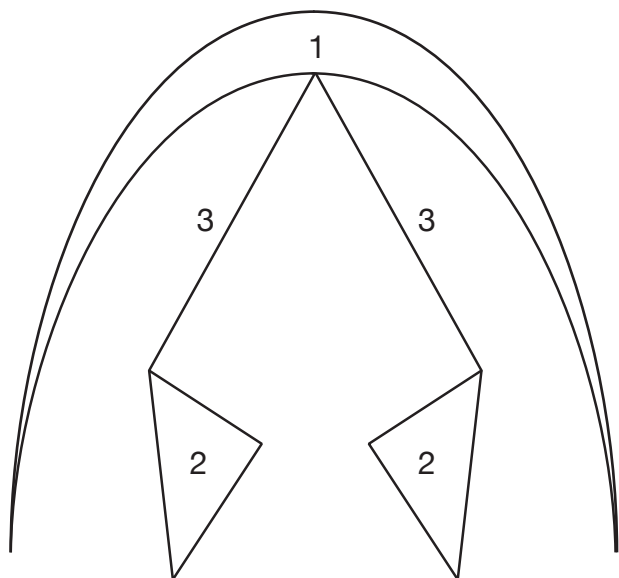
Laryngologist Emil Froeschels introduced the term *hyperfunction* to describe the use of excessive force in the laryngeal muscles, and *hypofunction* to describe the opposite state of mus-

<sup>8</sup> Scott McCoy, *Your Voice: An Inside View* (Princeton, NJ: Inside View Press, 2004), 115.

<sup>9</sup> McCoy, 119.

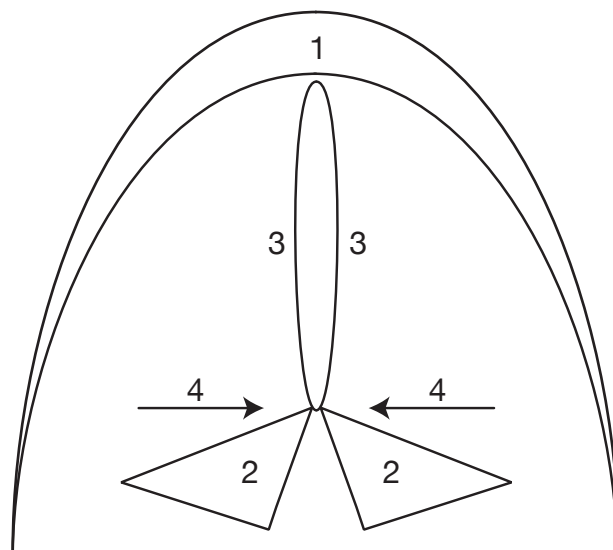
<sup>10</sup> Stark, 20.

<sup>11</sup> *Ibid.*, 21.



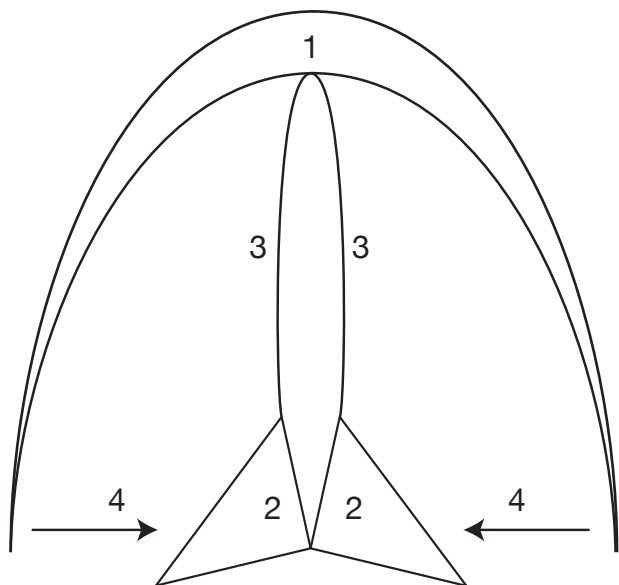
**Figure 1.1: Breathing**

Within the thyroid cartilage (1), the arytenoids (2) are apart and the vocal folds (3) are completely abducted for normal breathing.



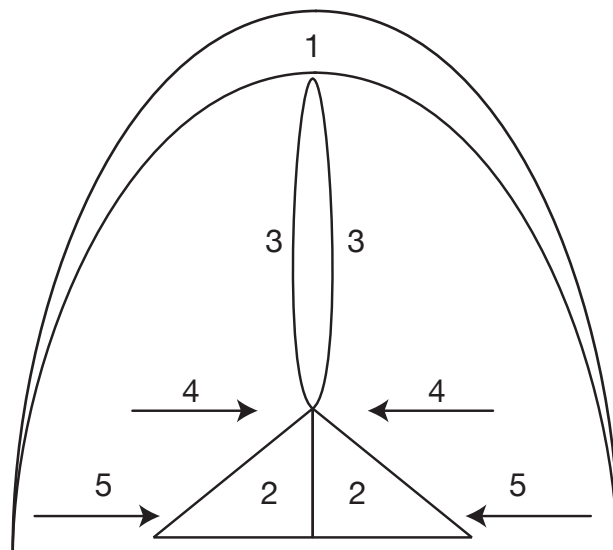
**Figure 1.2: Medial compression (Glottal "Chink")**

Within the thyroid cartilage (1), the arytenoids (2) are apart and the vocal folds (3) are completely abducted for normal breathing.



**Figure 1.3: Loose glottal closure**

Within the thyroid cartilage (1), the arytenoids (2) draw the vocal folds (3) together by the action of the interarytenoids (4), resulting in a loose glottal closure.



**Figure 1.4: Firm glottal closure**

Within the thyroid cartilage (1), the arytenoids (2) draw the vocal folds (3) together by the action of both the LCA (4) and the IA (5).

cular exhaustion.<sup>12</sup> According to Holmberg, et al., “it is generally held that an underlying component in vocal nodules is vocal hyperfunction, a hypertonic state of both intrinsic and extrinsic laryngeal musculature.”<sup>13</sup> Cooper adds that “the problem [of voice disorders] in most cases results from the cumulative burden of several factors acting upon the vocal mechanism over a period of time. Hard glottal attack appears to have no effect upon a healthy voice during normal use.”<sup>14</sup> Casper further defines hard glottal attack as a manner of initiating vowels in which the vocal folds adduct rapidly and completely prior to the initiation of phonation, and she states that “the production of hard glottal attack can be associated with muscle tension. The effort to produce it and its excessive repetition can injure the vocal folds.”<sup>15</sup> With regard to vocal nodules, several studies have correlated their incidence to such personality traits as high socialization rates and extraversion, as well as to health factors, such as allergies.<sup>16 17</sup>

What is clear from these statements is that the hard glottal attack by itself is not the cause of the damage, it is but one component. The problem results from the excessive tension (*hyperfunction*) that is required to create

such a hard attack—as well as its frequent repetition—cumulative with other environmental and personality factors. It is also important to note that most of the studies of the hard glottal attack are in relation to speaking, not singing. Judging from Boone’s statement that “the hyperfunctional overadduction of the vocal folds will result typically in limiting free vibration of the folds producing the tight dysphonia of the harsh voice or perhaps the laryngeal stutter of spastic dysphonia,”<sup>18</sup> it is hard to imagine a singer utilizing this degree of hyperfunction and still being able to produce a beautiful tone. The kind of laryngeal hyperfunction related to the hard glottal attack would most certainly be detected aurally by voice teachers, choral directors, and fellow choristers, and it would hardly be considered an acceptable, let alone beautiful, singing tone.

All of this suggests that the glottal attack in singing, if not a result of laryngeal hyperfunction, might be safe to use and will not likely result in vocal stress or damage. Stating that a particular practice is not harmful, however, is a far cry from justifying its place as a fundamental technique used by many of the greatest voice teachers of the nineteenth century. Nor does it explain Stark’s assessment of Garcia’s *coup de la glotte* as “the single most important pedagogical concept in the history of singing.”<sup>19</sup> Finally, just because an exercise or technique is not damaging to the voice does not warrant its inclusion in a choral rehearsal; pedagogical techniques and practices must be judiciously chosen for their benefits to the development of the singing voice. Therefore Garcia’s *coup de la glotte* must have not only been safe and vocally healthy, it must have produced extraordinary results.

<sup>12</sup> James Stark, *Bel Canto: A History of Vocal Pedagogy* (Toronto: University of Toronto Press, 1999), 20.

<sup>13</sup> Eva Holmberg, Patricia Doyle, Joseph Perkell, Britta Hammarberg, and Robert Hillman, “Aerodynamic and acoustic voice measurements of patients with vocal nodules: variation in baseline and changes across voice therapy,” *The Journal of Voice* 17, no. 3 (September 2003): 270.

<sup>14</sup> Cooper, 219.

<sup>15</sup> R.H. Colton and J.K. Casper, *Understanding Voice Problems: A Physiological Perspective for Diagnosis and Treatment* (Baltimore, MD: Williams & Wilkins, 1996), 79–80.

<sup>16</sup> Roy, Holt, Redmond and Muntz, “Behavioral Characteristics of Children With Vocal Fold Nodules,” *Journal of Voice* 21, no. 1 (March 2007): 166.

<sup>17</sup> Roy, Bless, and Heisey, “Personality and voice disorders: A multitrait-multidisorder analysis,” *Journal of Voice* 14, no. 4 (December 2000): 540.

<sup>18</sup> Boone, 5.

<sup>19</sup> Stark, 32.

### *Garcia's Glottal Onset: The coup de la glotte*

There are three forms of vocal onset commonly recognized today: the soft or aspirate onset; the hard or plosive onset, sometimes called the glottal onset; and the simultaneous or instantaneous onset, sometimes referred to as the coordinated or balanced onset.<sup>20</sup> Manuel Garcia's *coup de la glotte* is a firm onset, not an abrasive glottal plosive, and could be argued to be a separate type of onset altogether, clearly distinguished from, and an alternative to, the three types of onsets mentioned above.<sup>21</sup> He describes the *coup de la glotte* this way:

After you are thus prepared and when the lungs are full of air, without stiffening either the phonator or any part of the body, but calmly and easily, attack the tones very distinctly with a light stroke of the glottis on a very clear [a] vowel. The [a] will be taken well at the bottom of the throat, in order that no obstacle may be opposed to the emission of the sound. In these conditions the tones would come out with ring and roundness...It is necessary to prepare the stroke of the glottis by closing it, which stops and momentarily accumulates some air in the passage; then, much as a rupture operates as a means of relaxation, one opens it with an incisive and vigorous stroke, similar to the action of the lips in pronouncing the consonant [p]. This stroke of the throat also resembles the action of the palatal arch performing the movement necessary for the articulation of the consonant [k].<sup>22</sup>

#### *The Aspirate Onset*

The type of onset Garcia describes in his *Complete Treatise* cannot be confused with an aspirate onset. In the aspirate onset the vocal

<sup>20</sup> Stark, 21.

<sup>21</sup> Ibid., 20.

<sup>22</sup> Manuel Garcia, *A Complete Treatise on the Art of Singing: Part One*, The editions of 1841 and 1872 collated, edited, and translated by Donald V. Paschke (New York: GB Putnam's Sons, 1984), 41–2.

folds are abducted when the airflow begins (see fig. 1.1), and phonation occurs when the vocal folds are brought together. The result of this type of onset is an audible [h] before the tone begins. Quite frequently when using this type of onset the vocal folds are only partially adducted during phonation (see fig. 1.2), leaving a triangular shaped opening at the posterior of the glottis. This opening, or glottal “chink” allows a significant amount of air to pass through during phonation, thus causing an airy or breathy sound. Garcia's onset is clearly not an aspirate onset. Yet, as arguments against Garcia's technique rose, so did the number of voice teachers who made attempts to re-interpret the *coup de la glotte* as something it was not. William Vennard wrote, “I am convinced that Garcia did not mean the glottal plosive when he coined the expression *coup de la glotte*.”<sup>23</sup> He went on to explain that he believed Garcia's onset was more like an aspirate akin to Vennard's “imaginary [h].” Looking again to Garcia's own words, however, it is hard to imagine that he meant anything but a glottal attack when he wrote, “*The vowels should always be attacked by the coup de la glotte, and with the degree of force that is appropriate to the phrase.* One should scrupulously avoid having them preceded by an aspiration.”<sup>24</sup> (Italics are Garcia's.)

#### *The Hard Onset*

Garcia's stroke of the glottis is without question a glottal onset, although the degree of muscular tension is much less than the level warned against by laryngologists and speech therapists. In the hard or plosive onset, the vocal folds are completely adducted just prior to phonation (see fig. 1.4). There is a buildup of subglottal pressure below the larynx as the expiratory muscles are engaged. As the pressure builds, the muscular tension in the larynx resists the pressure right up to the point at which the pressure overcomes the laryngeal muscular

<sup>23</sup> Vennard, 189.

<sup>24</sup> Stark, 23.

tension and the vocal folds burst apart, initiating phonation with a hard, glottal sound. The problem with this type of onset is multi-faceted. The issue of vocal health is a primary concern and, as discussed above, if there is too much muscular tension in the larynx, the glottal onset can be a factor that contributes to vocal disorders. Another difficulty with this type of onset is that when the pressure and resisting tensions are too high, the plosive sound is rarely attractive or artistic. Finally, this type of onset can actually weaken glottal closure. Even though the vocal folds are completely adducted prior to phonation, the burst of air through the glottis is so strong that the vocal folds are blown apart and sent into loose phonation (see fig. 1.3). Although this type of onset seems similar to Garcia's *coup de la glotte*, it is entirely different in character and thus has led to years of confusion and misunderstanding about the distinctions between the two.

Garcia himself expressed this difference when he wrote,

One must guard against confusing the stroke of the glottis with a stroke of the chest [*coup de la poitrine*], which resembles a cough, or the effort of expelling something which is obstructing the throat. The stroke of the chest causes the loss of a large portion of the breath, and makes the voice sound aspirated, stifled, and uncertain in intonation. The chest has no other function than to nourish the tones with air, and it should not push them or shock them.<sup>25</sup>

The point of Garcia's *coup de la glotte* was firm adduction of the vocal folds leading to firm phonation. Once the subglottal pressure increases to the point at which the vocal folds will be blown completely apart when the muscular tension is released, firm phonation becomes an impossibility. Garcia's own description clearly eliminates the hard glottal attack or glottal plosive as a viable interpretation of the *coup de la glotte*.

<sup>25</sup> Garcia, 42.

### *The Coordinated Onset*

The third, and most preferred, type of onset recognized today is the balanced or coordinated onset. In this type of onset, the vocal folds are abducted prior to phonation. At the precise moment the airflow begins, the vocal folds are brought together and put into oscillation. In theory, this type of onset eliminates both the breathy [h] of the aspirate onset as well as the plosive of the glottal onset. The apparent difficulty with the coordinated onset, however, is the complexity inherent in adducting the phonatory muscles at the exact moment the airflow begins, which can be quite a challenge for singers. In addition, there is little room for error, in that adducting the folds too early will produce a slight glottal, while adducting the folds too late will yield an aspirate [h], neither of which would fall within the definition of a coordinated onset. Many voice teachers like William Vennard have taught the coordinated onset through the use of a silent "imaginary *h*,"<sup>26</sup> which seems to lean toward the aspirate onset and loose glottal closure. Perhaps the most important reason the coordinated onset is incomplete is that it does not specify the type of glottal closure during phonation, and could allow either firm or loose phonation.<sup>27</sup> Garcia's description of his onset specifies a firmly adducted glottis prior to phonation, not allowing for any kind of loose closure, thus leading to firm phonation and an ideal tone quality. It is primarily for this reason the *coup de la glotte* has been so successful.

#### *Using the coup de la glotte: Benefits*

When working with singers, whether in a choral rehearsal or a voice lesson, the goal is always efficient vocal production and a brilliant, high quality tone. Garcia believed that the brilliance of the vocal tone was a direct result of firm glottal closure during phonation.<sup>28</sup>

<sup>26</sup> Vennard, 186.

<sup>27</sup> Stark, 22.

<sup>28</sup> Austin, 526.

Acoustically speaking, strong glottal closure results in an increase in high-energy partials, while loose closure results in fewer and weaker harmonics. Austin comments, “it is common knowledge that when the vocal folds close firmly and are completely adducted during each glottal cycle the air flow cuts off suddenly and the energy in the source spectrum is much higher than when a ‘loose glottis’ is allowed.”<sup>29</sup> This fundamental, brilliant tone quality associated with firm phonation is separate and distinct from *timbre*, which is produced in the vocal tract. For example, a brilliant tone produced by firm glottal closure can have a bright or dark timbre, it can be rich and warm, or it can be thin and shrill. A tone produced by firm glottal closure can and should be used in choral settings as well as on the opera stage or in the recital hall. The opposite of firm glottal closure is loose glottal closure, which produces a tone that is breathy, weak, and veiled. Loose glottal closure is a result of a lack of tension in both sets of muscles that control the movement of the arytenoid cartilages. Recall that contracting the IA without the LCA results in a loose vocal fold closure (see fig. 1.3), while contracting the LCA without the IA results in a triangular-shaped “chink” at the posterior of the glottis (see fig. 1.2). This loose glottal closure is quite common in, and natural to, the speaking voice.

In a study conducted by Berit Schneider and Wolfgang Bigenzahn from 1998–2000, 546 normal-speaking young females (17 to 41 years; mean 20.7 years) underwent videostroboscopic and voice range profile examinations. They found that a large majority (76.2%) of subjects in their study showed an incomplete glottal closure during soft phonation, both in speaking and singing. When increasing the intensity, a significant percentage (34.9%) still showed incomplete closure.<sup>30</sup> The researchers

hypothesized that “perhaps less forceful contraction of the interarytenoid muscles is adopted by young women as an economic measure or as a means to accomplish a particular vocal quality aim, such as slightly breathy voice quality in terms of attractive appeal.”<sup>31</sup> If this is true, then it is no wonder our choirs are filled with young women who sing with a breathy and airy tone quality. Unless trained to do otherwise, most young singers will not completely bring the arytenoids together while singing. Learning to bring the arytenoids into full contact (see fig. 1.4) is challenging to say the least—primarily because it is counterintuitive to many young women’s everyday speech patterns. However, if there were a technique that could facilitate this type of glottal closure quickly and successfully, it would be well worth using. Garcia’s *coup de le glotte* is such a technique, and it has been used since the late nineteenth century for precisely that purpose.

Incorporating the *coup de la glotte*, or glottal onset, into a choral voice-building session is not difficult or time-consuming, and if done correctly, poses no proven risk to vocal health. Even Richard Miller, a strong advocate of the coordinated onset, suggests that a slight glottal onset would be wise and appropriate if the singer demonstrates a tendency toward breathiness.<sup>32</sup> In order to teach choral singers the feeling of firm closure, simply have them speak the American English phrase, “uh-oh.” This type of light glottal onset is not harmful and can be easily translated into a sung tone in a voice-building exercise (see ex. 1).

Another variation on this technique was purportedly taught by Garcia and described in 1931 by Homer Henley.<sup>33</sup> By singing groups of five semitones in sharply struck staccato on the vowel [o] or [i], the vocal folds are made to re-engage with each note, rather than remain

<sup>29</sup> Ibid., 528.

<sup>30</sup> Berit Schneider and Wolfgang Bigenzahn, “Influence of Glottal Closure Configuration on Vocal Efficacy in Young Normal-speaking Women,” *Journal of Voice* 17, no. 4 (December 2004): 478.

<sup>31</sup> Ibid., 479.

<sup>32</sup> Richard Miller, *The Structure of Singing* (New York: Schirmer, 1986), 8.

<sup>33</sup> Homer Henley, “Garcia’s Second Discovery,” *Etude* 49, no. 5 (May 1931): 361.



## Example 1: Light glottal onset

uh-oh, uh-oh, ah \_\_\_\_\_ uh-oh, uh-oh, ah \_\_\_\_\_

## Example 2: Staccato five-note chromatic scale

oh oh oh oh oh oh oh oh oh oh oh oh oh oh oh oh oh

loosely adducted in a legato gesture. Again, the light glottal onset is the key, as using an aspirate ‘h’ will not likely yield the type of closure desired (see ex. 2).

Using this type of onset in performance may be undesirable, since it can be hard to coordinate among many singers. Also, depending on the pitch level of the note to be sung, beginning with a glottal onset can create unnecessary tension in the vocal mechanism. But by utilizing the light glottal onset during voice-building, singers can learn to feel the sensation of a firm glottal closure, which is likely to translate into firmer, clearer tone quality in all their singing.

The *coup de la glotte* is significant because it describes a type of onset that not only can eliminate breathiness, but promotes complete glottal closure and firm phonation.<sup>34</sup> The relationship of onset to phonation is vitally important. If the vocal folds are set loosely during phonatory onset, they will retain that loose posture throughout phonation until the entire mechanism is reset with a new onset. Researchers Gould and Okamura asserted that the pre-phonatory setting of the arytenoids is the crucial period during which the entire character of phonation may be determined.<sup>35</sup> This is the reason that the *coup de la glotte* is such an important pedagogical tool. By firmly adducting the vocal folds prior to phonation, singers will be setting the vocal mechanism to produce a firm, brilliant, and efficient tone. Singers must learn the sensation

that accompanies a closed glottis in order to begin to understand firm adduction of the vocal folds while singing.

### Conclusion

The glottal plosive has been avoided in choral singing primarily because of the assumed risk to the vocal mechanism. However, if it were possible that a slight glottal onset such as Garcia’s *coup de la glotte* could be used without harm to the voice, it would be a great benefit to choral directors in training young singers to eliminate breathiness. By using a firmly adducted pre-phonatory setting with a slight glottal onset, the vocal folds are set for what James Stark calls “firm phonation.” In his incredibly detailed survey of the history of vocal pedagogy, he describes the process thus:

In the instant before phonation begins, the arytenoid cartilages are drawn firmly together. During phonation, the combined muscular forces of adductive tension, medial compression, and longitudinal tension maintain strong glottal resistance to the breath. There is a large closed quotient of the folds, a vertical phase difference in the pattern of closure, and a muco-undulatory wave that may affect voice quality. Strong glottal resistance leads to raised breath pressures and low rates of airflow through the glottis. The resulting voice quality at the sound source is rich in high frequency components. The pre-phonatory setting is under the voluntary control of the singer, since it is controlled by

<sup>34</sup> Stark, 22.

<sup>35</sup> Ibid.

the motor system. The subsequent monitoring of the vocal folds during phonation is controlled by the reflexogenic system, as well as by the control loop of the auditory feedback system.<sup>36</sup>

In other words, when the singer sets the vocal folds prior to phonation using the *coup de la glotte*, the entire phonation process is positively affected and the result is a strong and brilliant tone. Manuel Garcia discovered this over one hundred years ago and used it to train some of the best singers of the nineteenth century, as did many of his followers. Unfortunately, his concept of the *coup de la glotte* was misunderstood and vilified over the next century—so much so that many of us today have completely overlooked this simple and effective technique for developing beautiful tone in young singers. As Stark states, “Garcia recognized that the first step in vocal training is strong glottal closure. His *coup de la glotte* was the key to achieving firm phonation, and was arguably the single most important pedagogical concept in the history of singing.”<sup>37</sup> As choral directors, we are the primary voice teacher for many of our singers. With care and prudence, we should be able to employ the *coup de la glotte* in our rehearsals without risking vocal health. By doing so, we can help our singers discover the brilliant tone that results from singing with firm glottal closure.

TCS

### References

- Austin, Stephen F. “The Attack on the *coup de la glotte*.” *Journal of Singing* 61, no. 5 (May/June 2005): 525–529.
- Boone, Daniel R. *The Voice and Voice Therapy*. Englewood Cliffs, NJ: Prentice-Hall, 1977.

- Colton, R. H. and J. K. Casper, *Understanding Voice Problems: A Physiological Perspective for Diagnosis and Treatment*. Baltimore, MD: Williams & Wilkins, 1996.
- Cooper, Morton. *Approaches to Vocal Rehabilitation*. Springfield, IL: C. C. Thomas, 1977.
- Doscher, Barbara. *The Functional Unity of the Singing Voice*. Metuchen, NJ: Scarecrow Press, 1988.
- Garcia, Manuel. *A Complete Treatise on the Art of Singing: Part One*, translated and edited by Donald Paschke. New York: Da Capo Press, 1984.
- Holmberg, Eva, Patricia Doyle, Joseph Perkell, Britta Hammarberg, and Robert Hillman. “Aerodynamic and acoustic voice measurements of patients with vocal nodules: variation in baseline and changes across voice therapy.” *Journal of Voice* 17, no. 3 (September 2003): 269–282.
- McCoy, Scott. *Your Voice, An Inside View*. Princeton, NJ: Inside View Press, 2004.
- Miller, Richard. *The Structure of Singing*. New York: Schirmer, 1986.
- Roy, Nelson, Diane M. Bless, and Dennis Heisey. “Personality and Voice Disorders: A Multitrait-Multidisorder Analysis.” *Journal of Voice* 14, no. 4 (December 2000): 521–548.
- Roy, Nelson, Kellianne Holt, Sean Redmond, and Harlan Muntz. “Behavioral Characteristics of Children With Vocal Fold Nodules.” *Journal of Voice* 21, no. 1 (March 2007): 157–168.
- Schneider, Berit, and Wolfgang Bigenzahn. “Influence of Glottal Closure Configuration on Vocal Efficacy in Young Normal-speaking Women.” *Journal of Voice* 17, no. 4 (December 2004): 468–480.
- Stark, James. *Bel Canto: A History of Vocal Pedagogy*. Toronto: University of Toronto Press, 1999.
- Vennard, William. *Singing: The Mechanism and the Technic*. New York: Carl Fischer, 1967.

<sup>36</sup> Stark, 31.

<sup>37</sup> Ibid., 32.

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