

**The Voice Teacher's Guide to Vocal Health for Voice Students: Preventing,
Detecting, and Addressing Symptoms.**

D.M.A. Document

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Abstract

A survey of the literature addressing the training and vocal health of singers leads to pedagogic writings on singing and the voice as an instrument, instructions on vocal hygiene, writings on how to address vocal faults, and recently published works addressing the rehabilitation and care of the disordered singing voice. With the understanding that singing is a highly athletic and artistic form of vocalization that is prone to injury, there is a gradual but nonetheless noteworthy focus on the vocal health needs of singers, and an increasing awareness to educate singing students in the basics of vocal hygiene so as to preserve a healthy voice. This same population is faced with many lifestyle changes, together with often-stressful academic programs, competitions and auditions that increase their need for a healthy voice, while also creating conditions that may lead to vocal attrition.

The first chapter inquires as to the documented vocal health and knowledge of students, together with an understanding of the most common voice complaints and disorders in the singer-student population. Chapter two addresses the principles of phonation and vocalization. It is followed by vocal hygiene and healthful practice recommendations in the third chapter, with the fourth chapter focusing on a suggested intake procedure for incoming students. Methods of assessing vocal health throughout students' careers as singers will be discussed. The fifth chapter concludes by devising a plan to address various voice symptoms.

While an anomaly in vocal function may be more easily noticeable by the experienced singer, it is more challenging to differentiate a symptom of a voice disorder from a manifestation of faulty technique in voice students. Among many functions, college voice teachers have the primary responsibility of instilling in their students an understanding of proper vocal function, coordinating optimal uses of the systems of respiration, phonation, resonance and articulation to produce a healthy singing voice. Such a complicated interplay leads to different learning curves depending on individual characteristics. During this process, “undesirable” sounds or habits may manifest themselves, while a teacher’s focus might be on another aspect of technique. Differentiating between vocal faults and vocal disorders, and preventing the former from developing into the latter becomes a necessary responsibility of the teacher. The fifth chapter of this document offers a guide to address such instances.

The goal of this document is to provide voice professors with the information necessary to better understand the vocal health challenges university voice students face, assess incoming singers, provide them with preventative vocal health information, and devise a plan for recognizing and addressing areas of concern to their healthy vocal development. The forms contained within this document can be used as an aid for teachers to assess their students at the onset of study, and periodically throughout each student’s instruction. They will also be useful in navigating vocal symptoms so as to more efficiently detect and address possible voice disorders of students enrolled in programs geared to the training of the classical voice in American Universities.

This document is dedicated to my parents, Sona and Nerces Khatcherian, whose passion, hard work, integrity and commitment to all projects they undertake is a constant inspiration.

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Chapter 1: VOICE STUDENTS AND VOCAL HEALTH

SINGERS' VOCAL HEALTH

A growing environment of interdisciplinary exchange between various voice professionals, together with numerous accounts of famous singers who have publicly acknowledged having been diagnosed with voice disorders, such as Julie Andrews,¹ Rolando Vilazon,² Denyce Graves,³ or Nathalie Dessay,⁴ have heightened the attention given to the vocal health needs and care of the professional singer's instrument.

Sound at its basic level is a series of compressions and rarefactions within a medium that is a result of interplay between a power source, a pitch source, and a resonating space.⁵ In voicing, this exchange is between the systems of respiration, of phonation, and of resonance. Articulation further aids in filtering the sounds created by changing the shapes of the resonators to produce language.⁶ Singers use this basic voicing design, re-learning and refining each system of voicing and their coordination to an

¹ "Julie Talking about her Voice, Part 2," YouTube Video.

² "Rolando Vilazon on his Cyst on his Vocal Cords," YouTube video.

³ "The Surgery that Saves Silenced Singers," *Weekend Edition Sunday*, an NPR series.

⁴ "Natalie Dessay," an episode in *Thé ou café*.

⁵ McCoy, *Your Voice*, 17.

⁶ McCoy, *Your Voice*, 26.

intricate art form, eventually capable of astounding vocal acrobatics that elicit awe and applause.

There is much written about the similarity in training and especially conditioning between athletes and singers.⁷ Vocal athletes are prone to voice problems by repetitive and increased use of their instrument in a similar way to a runner who may encounter knee or ankle injuries as a result of overuse. It would seem evident that increased risk may develop as students embark upon the study of singing. This explains the ensuing need to address the prevention and early recognition of organic or functional voice problems in the student population and to provide voice teachers with pertinent information.

While advanced singers are attuned to minute changes in their vocal mechanisms, it is more challenging for students who are in the preparatory phase of their singing careers to differentiate between problems with singing technique and pathologic conditions that warrant medical attention.

Works such as Beninger's "The Singer's Voice,"⁸ Wicklund's "Singing Voice Rehabilitation,"⁹ and Gates' "The Owner's Manual to the Voice"¹⁰ address vocal hygiene and provide information regarding the singer's injured voice. "Solutions for Singers" by

⁷ Gates, *Owner's Manual*, 25-54.

⁸ Benninger, *Singer's Voice*.

⁹ Wicklund, *Singing Voice*.

¹⁰ Gates, *Owner's Manual*.

Richard Miller¹¹ and “The Diagnosis and Correction of Vocal Faults” of James McKinney¹² concentrate on problems students may encounter in vocal technique and ways to address these vocal faults in the voice studio. This document aims to bridge the gap between the literature for addressing vocal faults in voice training and that regarding voice disorders by providing educators with the necessary tools to recognize and address potential symptoms of voice disorders during voice study. While it may be relevant to teachers of students specializing in musical theater, or commercial music, the conversation in this document is geared towards university voice teachers training students in the classical style and repertoire.

THE LIFE OF A STUDENT

Whether it is to pursue a path in Education, Pedagogy, and/or Performance, thousands of students set out to study voice in universities across the United States every year. From freshman to doctoral levels, most programs require this population to continually register for one common course: applied voice instruction.¹³

While music study may commence at an early age for instrumentalists, I have noticed that the majority of voice pedagogues prefer to commence private voice instruction around mid-teens. This preference in starting age of individual vocal study is partly attributable to the pedagogic influences of pubertal changes both males and females undergo during adolescence. Changes to vocal fold length, thickness, and

¹¹ Miller, *Solutions for Singers*.

¹² McKinney, *Diagnosis and Correction*.

¹³ National Association of Schools of Music, *NASM Handbook*, 156-155.

laryngeal cartilage calcification occurs throughout the adolescent and early adult years. This results in major differences in laryngeal valving and configuration, air pressure control, and general voice classification,¹⁴ making it preferable to commence private voice study after the majority of these changes take place. The American Academy of Teachers of Singing has revised this stance on starting age for voice instruction noticing the benefits of teaching singing to children. It states:

“Upon further investigation no scientific, pedagogical, or physiological evidence indicates that child voice pedagogy is inherently harmful to children’s bodies, minds, or spirits.”¹⁵

As teachers heed this advice, we may notice that the implementation of age appropriate individual voice instruction for children may aid in a smoother transition of high school vocalists to college vocal studies.

Partly depending on the years of study accumulated pre-enrollment, freshmen arrive for voice study at American Universities with differing levels of musical and vocal preparedness. They are then promptly geared towards meeting regular jury and hearing requirements attesting to their improvement and participate in studio and performance classes to present their repertoire and practice singing in front of an audience. Students are required to give recitals showing proficiency in a range of languages and styles, as well as to participate in ensembles. Depending on the school’s curriculum, participation in a choir with daily rehearsals is usually mandatory, especially for undergraduate

¹⁴ Titze, *Principles of Voice*, 198-200.

¹⁵ American Academy of Teachers of Singing, *Teaching Children*.

singers.¹⁶ There might be other opportunities to sing, such as community opera choruses, other ensembles that may be of special interest to the student, performing compositions of peers, and weekend work singing in a church choir or other community opera chorus. Students pursuing degrees in music education student-teach, using their speaking voice for extended periods of time throughout the week. Graduate students with teaching assistantships may have the responsibility of giving private and class voice lessons, adding to their daily vocal load. Well-adjusted students will certainly also have many opportunities to partake in social dialogue, adding a considerable amount to daily use of their voice.¹⁷

Arriving at the high level of vocal artistry required by the classical vocal repertoire involves many years of training in singing. The curriculum for voice students across universities entails the study of languages and singers' diction, musicianship, scene work, body awareness classes, music literature classes, ensemble work, choral performances, some universities offer voice science classes, audition techniques classes, and so forth.¹⁸

There is then great pressure on vocal preparedness, requiring a good vocal technique and stamina to increase students' chances of being vocally ready by the time they are in their mid-twenties. Students who are in performance track degrees work toward vocal preparedness to participate in auditions and competitions, usually by the

¹⁶ National Association of Schools of Music, *NASM Handbook*, 156-155.

¹⁷ Schloneger, "Graduate Student Voice Use," e265.

¹⁸ National Association of Schools of Music. *NASM Handbook*, 156-155.

time they arrive at Masters' studies. Summer programs and Young Artists Programs are at the forefront of their preoccupations. To satisfy all these requirements and be successful in their studies, daily practice is compulsory. Being in good vocal health is conducive to students' vocal readiness and advancement so as to attain their career aspirations.

When leaving home for college, transferring, or moving on to graduate school, students often most undergo situational adjustments, be they living, social, or academic. Compared to high school years, freshmen are away from their parents, establish their own eating and living habits, make new friends, search out extra-curricular activities, may take on part-time work, and often find themselves hearing, studying, and making more music per day than they ever had until now. A hobby is quickly turned into an academic career, and an exciting yet precarious situation is ahead of them, in large part dependent on their ability to adapt quickly and responsibly to this new situation.

THE ROLE OF THE VOICE TEACHER

Among many other functions, a discussion of which is beyond the scope of this document, the primary responsibility of voice teachers is to instill in their students an efficient vocal technique, enhancing their chances at success and longevity in their careers as singers. Teachers might encourage their students to pursue competitions, auditions, or get involved in ensemble work if they assess the student to be sufficiently prepared for such challenges. A weekly lesson and studio class performances being the norm, voice teachers are the first witness to any changes that might develop in a student's health. They are therefore often involved in ensuring the good vocal health of their

students, recognizing faults that may arise, encouraging good care of their instrument, and recommending medical care when appropriate.

The voice professor is often the point of contact in students' academic careers, as advisors and advocates for their pupils. Whether it is to collaborate with choir directors regarding voicing, art song literature professors, or opera directors regarding choice of repertoire and casting, it is to the student's best interest that their voice teacher's advice and recommendations be sought out.¹⁹

A study examining health information seeking behaviors in young classically trained singers found that 75% of students in vocal distress initially sought out their voice teachers for advice.²⁰ Voice teachers should therefore have the information necessary to address a student's vocal concerns, referring them to a voice therapist, laryngologist, the input of a singing health specialist, or other health professional as necessary.

Collaboration and open exchange of the voice teacher with a voice care team is also in the student's best interest. A joint technical report between the American Speech-Language-Hearing Association, the National Association of Teachers of Singing, and the Voice and Speech Trainers Association recommends interdisciplinary training and care of the disordered voice, further stating, as one of its guidelines:

“The preparation of the teachers of singing needs to be augmented in a comparable manner to include training in anatomy and physiology, behavioral management of voice problems, development of the speaking voice, and the

¹⁹ Wicklund, *Singing Voice*, 133-134.

²⁰ Petty, “Health Information-Seeking Behaviors,” 330-335.

singing teacher's role in working with the speech-language pathologist and the physician in the medical management of voice disorders.”²¹

I suggest that this interdisciplinary approach be implemented and facilitated from the onset of voice studies in universities, perhaps in a form of intake discussed in chapter 4. In the least, teachers are urged to inform themselves and develop a roster of good medical professionals in the area who specialize in treating the voice. Ideally, such centers would have a laryngologist, a speech therapist, and a singing health specialist as part of their team, all with specializations in voice disorders, and knowledgeable about the high demands of the professional voice user- singer. An ideal situation would be to have such a team be available and affiliated with the specific school of music’s voice department, so as to encourage a team approach in intake and intervention, should students require medical attention. At Western Michigan University, Wicklund presents such a team approach, where the voice department is closely connected to a campus team of speech-language pathologists and has access to a voice clinic if need be. The voice department also has implemented a special Therapeutic Voice Study Protocol to follow if a student requires special consideration for vocal concerns.²² Voice teachers should urge students to inform themselves of their medical insurance plan to make sure that expensive visits to voice health specialists would be covered. While HIPAA privacy laws protect

²¹ American Speech-Language-Hearing Association, *The Role of the Speech- Language Pathologist*.

²² Wicklund, *Singing Voice*, 133-143.

individuals against the disclosure of their personal health information to other parties,²³ it would behoove students to share pertinent vocal health information with the voice teacher to whom they have entrusted their vocal education. Correspondence between voice teacher and medical team may be established if and only if the student feels freely comfortable with authorizing such an exchange.

A REVIEW OF STUDIES ON THE PREVALENCE OF VOICE SYMPTOMS OR DISORDERS IN VOICE STUDENTS

Merrill et al found 29% of university students across all departments to report a history of voice disorders, a prevalence rate consistent with that of the general adult population. The study also found that voice disorders negatively impacted their “psychosocial and physical functioning.” Students were further found to be at a disadvantage regarding seeking medical care, because of limited access to insurance coverage for specialty care. They were also found to be less likely to seek treatment.²⁴

From a sample of 79 undergraduate and graduate students, Sapir found only 13% to be free of symptoms, while the remainder had anywhere from 1 to 4 concurrent symptoms. Students with multiple symptoms were negatively affected by anxiety and depression in general as well as in regard to their voice, and suffered from the negative impacts of an indisposed voice by missing auditions or performances, stunted progress in

²³ U.S. Department of Health & Human Services Office for Civil Rights, *Sharing Health Information*.

²⁴ Merrill et al., “Voice Symptoms and Voice-Related Quality of Life in College Students,” *Annals of Otolaryngology, Rhinology & Laryngology* 122, no.8 (2013): 511-519.

	Population	Mean Age	method of obtaining information
Ray Merrill et al. , "Voice Symptoms and Voice-Related Quality of Life in College Students," <i>Annals of Otolaryngology, Rhinology & Laryngology</i> 122, no.8 (2013): 511-519.	545 students from a Christian college	22.7 +/- 5.3	Survey
Emily Tepe et al. , "A Pilot Survey of Vocal Health in Young Singers" <i>Journal of Voice</i> 16, no. 2 (2002): 244-250.	129 young choir singers	16 +/- 4.4	Survey
Shimon Sapir , "Vocal Attrition in Voice Students: Survey Findings", <i>Journal of Voice</i> 7, no.11 (1993): 69-74.	74 female voice students	20.5 +/- 2.7	Survey
Debra Phyland , Jennifer Oates, and Ken M. Greenwood, "Self-reported Voice Problems among three groups of professional singers". <i>Journal of Voice</i> 13, no. 4 (1999): 602-611.	84 opera singers	36.97	Survey
Maria Emilia Elias et al. , "Normal Stroboscopedaryngoscopy: Variability in Healthy Singers". <i>Journal of Voice</i> 11, no.1, (1997): 104-107.	65 Healthy, asymptomatic voice students from a prestigious conservatory	26	Stroboscopedaryngoscopy
Lundy et al. , "Incidence of Abnormal Laryngeal Findings in Asymptomatic Singing Students". <i>American Academy of Otolaryngology- Head and Neck Surgery Foundation</i> 121, no. 1 (1999): 69-77.	57 "asymptomatic" singing students	26,3 men 30.9 women	Survey and laryngeal evaluation with rigid stroboscope

Table 1. Surveys of Voice Symptoms/Voice Disorders in Student Populations

Continued.

Table 1. Continued

Percentage with findings	symptoms or disorder	other findings
29% self-admitted voice problem	Hoarseness 82% Frequent throat clearing 59% Difficulty projecting 49% Voicing discomfort 42% Effort voicing 41% Voice tires quickly 34% Wobbly or shaky voice 30% Chronic soreness 22% Chronic dryness 22% Bitter or acidic taste 21%	V-RQOL survey indicates poor psychosocial and physical well being for singers with voice symptoms.
55.8% have experienced vocal difficulty 31% sensation of "over-singing" 43% felt they had to strain to sing	Hoarseness 42.6% Fatigue 24% Change in voice range 19.4% tickling or choking sensation 17% Volume disturbance 16.3% Breathiness 15.5% Prolonged warm-up 6.2% Other Voice problem 12.4% Voice hurt after singing 10% Voice hurt while singing 8% Voice hurt when speaking 5%	
26% One-two symptoms 61% Multiple symptoms 47% sought medical help for voice problems	Throat Dryness 81% Throat Tightness 66% Vocal Fatigue 64% Throat Discomfort 58% Hoarseness 48% Reduced pitch range 36% Throat pain 19%	20% experienced serious consequences from chronic vocal problems
40.5% had experience with a diagnosed disorder 6.33% reported symptoms of vocal impairment related to the singing voice. 22.9% unable to perform due to a problem with the voice in the past year.	Laryngitis 21.5% Nodules 0 Oedema 4.7% Paralysis 1.2% Polyp 3.6% Voice problem of no known medical reason 17.9% Other Voice problem 2.4%	Study was a comparison between singers of different genres. Any data including information regarding singing styles other than opera are omitted.
58.5% Abnormalities found	Reflux Laryngitis 42% Nodules 3% Cysts 3% Varicosity 3% Asymmetry 6% Weakness 1.5%	
History of vocal symptoms	Stroboscopic findings	A large proportion of students had predisposing risk factors and symptoms such as reflux, caffeine and alcohol consumption, stress, high voice usages
Hoarseness 84.2% Breathiness 38.6% Volume difficulties 24.6% Pitch Range 49.1% Voice worse in the morning 50.9% Voice worse in evening 21.1% Throat clearing 36.8%	Nodules 7% Unilateral cyst 1.8% Erythema 61.4% Edema 29.8% Significant glottal gap 21% Segmentally reduced mucosal wave 38.6% Mildly reduced amplitude of vibration 38.6%	

their studies, or abandoning singing studies.²⁵ In Tepe, et al, 55.8% of singers younger than 25 years of age have experienced vocal difficulty.²⁶ Phyland et al found 51% of opera singers to have been diagnosed with a symptom of a voice disorder.

While not based on a student population, the latter study's findings should awaken voice care professionals to the needs of this population, and the implementation of preventive measures during training.²⁷ Lastly, a study with relatively surprising results examined asymptomatic students of a prominent US conservatory, finding 58% of their stroboscoped laryngoscopic examinations to reveal abnormalities.²⁸ Lundy et al. studied 57 asymptomatic singing students who reported having previously had a history of vocal complaints. 8.3% of the sample population was found to have signs of benign vocal fold lesions, 61.4% had vocal fold inflammation, and 29.8% presented with edema (swelling with fluid retention).²⁹ Although based on asymptomatic singing teachers rather than students, a similar study by Sataloff et al found 86.1% of subjects to have one or more abnormal laryngeal findings after videostroboscopic examination.³⁰ Table 1 (pages 10-

²⁵ Shimon Sapir, "Vocal Attrition in Voice Students: Survey Findings", *Journal of Voice* 7, no.11 (1993): 69-74.

²⁶ Emily Tepe et al., "A Pilot Survey," 244-250.

²⁷ Phyland et al., "Self-reported Voice Problems." 602-611.

²⁸ Elias et al., "Normal Stroboscoped Laryngoscopy," 104-107.

²⁹ Lundy et al., "Incidence of Abnormal Laryngeal Findings," 69-77.

³⁰ Sataloff et al., "Prevalence of Abnormal Laryngeal Findings," 577-583.

11) provides further details about these studies, along with relevant symptoms and/or stroboscopic findings.

Given the large ratio of subjects with high-performing voices and lack of symptoms, this gives rise to many questions: should students have a baseline stroboscoped laryngoscopy if there are no symptoms, so as to assess “normal voice?” Should those findings be known by the voice teacher and be taken into account during instruction? Also, in the absence of symptoms, but presence of an abnormality upon laryngeal examination, would the voice have a different timbre, or be classified in a different *Fach*? I would further question whether students who revealed symptoms or who were diagnosed with a condition might have pre-disposing factors that were dormant until other contributing factors gave rise to symptoms.

Referring back to table 1, where the above referenced studies on student subjects are summarized, I note the need for future studies based on a larger sample of both male and female voice students in universities, surveying both voice symptoms as well as stroboscopic findings. Based on numerous anecdotal accounts of late diagnosis of voice disorders that are often overlooked by both teacher and student, together with symptoms in voice students that are substantiated by these five studies, it is imperative that voice departments in universities implement voice health awareness programs. Such programs would ideally include a system for recognizing risk factors, assessing symptoms, preventing vocal injuries, and sensitizing students to their vocal needs, encouraging a mentality of seeking out voice health professionals when needed.

VOCAL TECHNIQUE, VOICE DISORDER, OR...?

As pointed out in the previous section, many of the symptoms listed in Table 1 may be indicators of a voice disorder, or may point to a yet imperfect vocal technique. I note that while this presumption has not been clearly stated in the literature, we may instead search for isolated clues that will offer some plausible basis for this, or perhaps point us to other possibilities. Writings on the singing voice with symptoms of voice disorders often point to the possibility of incorrect or insufficient vocal technique as a possibility for the symptoms heard, or as a contributor to the diagnosed disorder. On the other hand, pedagogic books on the training of singers often warn, in isolated cases, of the possibility of a voice disorder. The following are some examples from the literature highlighting such discussions.

In examining “Chief Complaints and Probable Diagnoses”³¹ in singers, Benninger points to the following complaints: hoarseness, fatigue, breathiness, need for a prolonged warm-up, volume disturbances, pain, scratchy voice, and the sensation of globus. While many of these symptoms point to medical diagnoses, fatigue is listed as an overuse of the voice, volume disturbances point to technique issues (among other symptoms), and the feeling of an itchy voice or sensation of globus may have a diagnosis of vocal abuse. In explaining vocal fatigue, “Common Causes of Vocal Overuse”³² point to various factors in vocal load and voice hygiene, including “singing/talking under tension.”

³¹ Benninger, *Singer's Voice*, 37.

³² Benninger, *Singer's Voice*, 38.

Benninger lists Additional Source of Dysphonia in Singers as:

“ Inadequate preparation: limited practice and rehearsals, *poor or inadequate training in general, or singer’s voice and level of training not suitable for the role.*
Insufficient warm-up
Poor environment for practice, rehearsing
Working through injury
Errors in technique
Excessive muscle tension in tongue, neck, or larynx
Excessive Volume
Poor or inadequate abdominal support.”³³

While errors in technique are specifically mentioned, the items italicized in the above list are certainly within the realm of expertise of a vocal pedagogue and advice a voice teacher or singing health specialist may provide.

Wicklund singles out the confusing issue of distinguishing normal-voice breathiness from dysphonia.³⁴ Developmental glottal chinks resulting in breathiness in young singers are a frequent occurrence singing teachers are accustomed to hearing in this population, especially in females.³⁵ Singers also might not yet have acquired the necessary respiration/phonation coordination to approximate the vocal folds in the desired, balanced mode of tone production. Achieving a balanced glottal onset with a focused tone could take years to achieve, Wicklund mentions. It is then for the teacher of singing to make a judgment call on whether to continue voice instruction with this goal in mind, or to refer the student to a laryngologist. Yet again, the author explains a symptom by either warranting further voice instruction, or medical care.

³³ Ibid.

³⁴ Wicklund, *Singing Voice*, 38-39.

³⁵ McKinney, *Diagnosis and Correction*, 85.

Halstead mentions a thin line when trying to differentiate between lack of vocal training and the presence of symptoms of vocal fold nodules.³⁶

In discussing Hyperfunctional phonation, McKinney highlights the dangers of extended or extreme use of this mode of phonation leading to voice disorders:

“It is important that a teacher of singing be able to identify the symptoms of vocal abuse or misuse, and that the student who has such symptoms be urged to seek professional medical counsel.”³⁷

The author warns of symptoms such as hoarseness, loss of range after a short amount of singing, or that of a limited or absent vibrato.³⁸

The prevalence of writings such as those just described above together, personal experience teaching, observing voice lessons, and observations in voice clinics leads me to confirm the earlier stated presumption.

THE NATURE OF VOICE DISORDERS AND THEIR SYMPTOMS

According to much of the literature regarding voice disorders in singers, the simple utterance of the word “nodules” is the most dreaded of all diagnoses.³⁹ While this is in fact a common finding, it is also one of the disorders best addressed by retraining through a combination of speech and singing therapy.⁴⁰ Before delving further into the topic, let us briefly look into the nature of voice disorders. This overview will serve to

³⁶ McCoy, *Your Voice*, 136.

³⁷ McKinney, *Diagnosis and Correction*, 87.

³⁸ Ibid, 88.

³⁹ Hogikyan, et al., “Vocal Fold Nodules,” 128.

⁴⁰ Altman, “The Professional Voice,” 1091.

clarify a few things about dealing with symptoms of voice disorders: 1) Information is a powerful weapon. An informed teacher will recognize symptoms, address them, and when needed, will promptly urge the student to seek a consultation with a medical professional with lesser fear of the diagnosis. 2) The voice is a highly resilient instrument, and will withstand abuse and self-repair when symptoms are recognized early on⁴¹. 3) Self-awareness, good care and vocal hygiene can ward off a big majority of voice problems. 4) In many cases, an early diagnosis of a functional disorder caused by misuse of the voice is a chance to address the problem, perhaps resulting in an even better technique & future resilience. 5) And last but not least, a majority of voice disorders result from a combination of factors⁴²: a predisposition to an irritated vocal fold surface (the epithelium) will make the folds more susceptible to mechanical damage. A weakened muscle tone often entails compensatory behaviors, especially in high performing vocal athletes, leading to vocally hyperfunctional behaviors.

Knowing more about voice disorders commonly found in voice students and the symptoms or vocal habits that need to be addressed in the voice lesson or warrant a doctor's attention is of crucial importance for voice teachers. Many books explain voice disorders, their etiology and treatments in detail. Readers are encouraged to seek more information in works that discuss this topic at large, such as Rubin's *Diagnosis and Treatment of Voice Disorders*.⁴³ While it is important to know about these disorders, we

⁴¹ McCoy, *Your Voice*, 141.

⁴² Altman, "The Professional Voice," 1092.

⁴³ Rubin, *Diagnosis and Treatment*.

are here concerned with understanding symptoms. Reviewing table 2 (on page 19) and the various symptoms associated with voice disorders, we can see how some of these symptoms can easily be confused with voice symptoms of a student with a yet imperfect technique.

SYMPTOM ↓	DISORDER →																							
	Laryngeal Edema and Erythema	Laryngitis	Hemorrhage	Vascular Ectasia	Nodules	Cyst	Polyp	Polypoid Corditis	Vocal Fold Bowing	<i>Sulcus Vergeture</i>	Laryngeal Granuloma	Laryngeal Contact Ulcer	<i>Laryngeal Web</i>	Laryngeal Papilloma	<i>Kerato</i> sis	Cancer	Arthritis- CT or CA	Muscle Tension Dysphonia	<i>Spasmodic Dysphonia</i>	<i>Essential Vocal Tremor</i>	Unilateral VF Paresis or Paralysis	<i>Arytenoid Dislocation</i>	Laryngeal Sicca	
Asymptomatic	X			X							X	X		X		X						X		
Sudden Onset of Disorder			X				X																X	
Vocal Fatigue	X	X		X	X	X	X	X	X	X	X	X						X	X			X		X
Laryngeal Pain		X									X	X					X	X	X				X	
Sore Throat	X	X															X							
Raw or Tickling Sensation		X									X	X												
Throat Clearing		X									X	X										X		X
"Lump" Feeling in Throat											X	X					X					X		X
Hoarseness	X	X	X	X	X	X	X	X			X	X		X	X	X						X	X	
Morning Hoarseness	X										X	X										X		
Breathiness				X		X		X	X	X	X	X	X	X								X		
Dysphonia		X	X		X	X	X	X		X				X					X		X		X	
Aphonia		X	X											X					X			X		
Diplophonia						X	X				X	X						X						
"Throaty" Voice	X		X					X			X	X							X					
Reedy Quality Voice										X			X											
Pressed Voice																		X	X					
Low Speaking Voice								X	X		X	X						X	X					
High Speaking Voice											X	X	X									X		
Monotone Speaking Voice								X	X	X								X	X					
Limited Volume (Speaking)													X						X					
Voice Weakens with use	X	X						X	X		X	X						X	X			X		
Loss of Flexibility	X	X	X	X	X	X	X	X	X		X	X						X				X		X
Change in Timbre	X	X						X			X	X		X	X	X		X				X		
Loss of Range	X	X	X	X	X	X	X	X	X	X								X	X	X		X		
Loss of Upper Register		X			X	X	X	X										X				X		
Loss of Lower Register		X							X	X			X									X		
Pitch Breaks	X	X			X	X	X		X									X	X			X		
Need Frequent Breaths	X	X			X	X	X	X	X								X							
Unusual Vibrato																		X	X	X				
Difficult Onset	X	X			X	X	X	X	X	X									X			X		X
Sudden "Hard" Onsets			X				X				X	X						X	X					
Effortful Vocalizing	X	X	X		X	X	X		X	X	X	X						X	X					X
Long Warm-Up	X				X	X	X		X									X				X		X
Difficulty with <i>pp</i>		X	X		X	X	X	X										X				X		
Difficulty with <i>ff</i>		X					X		X	X														X
Difficulty with high Hz <i>pp</i>	X	X			X	X	X	X										X	X					
Inability to Sustain Note		X	X					X												X		X		
Inability to <=> on One Note		X	X		X	X	X	X	X											X				

Disorders listed in italics are less commonly found in young college age students

This data is derived from:

Franco, Ramon A, and Jennifer G. Andrus. Common Diagnoses and Treatments in Professional Voice Users. *Otolaryngologic Clinics of North America*, 40 (2007), 1025-1061.

Gates, Rachael, L. Arrick Forrest, and Kerrie Obert, *The Owner's Manual to the Singer's Voice*. New York: Oxford University Press, 2013.

Wicklund, Karen. *Singing Voice Rehabilitation*. Clifton Park: Delmar, Cengage Learning, 2010.

Table 2. Voice Disorders and their Symptoms

Collected from data across the literature, Table 2 provides us with information regarding the location of common voice disorders in singers in relation to the different layers of the vocal folds. For a more thorough explanation of the structure of the vocal folds, readers are urged to consult chapter two of this document. We will here provide an overview of the different types of disorders that may be found in performers along with their symptoms. There are many ways of sorting out voice disorders based on different classifications. Two distinct categories are that of organic vs. functional. Changes to the laryngeal tissues of the vocal folds belong in the organic voice disorder category. Functional disorders are those that are brought about by misuse of the voice, but without any sign of structural changes to the vocal folds.⁴⁴ These two categories are closely related, as functional disorders may give rise to organic ones, and vice versa. A five-category voice disorder classification results in the following subdivisions: structural changes of the vocal folds, neurogenic voice disorders, systemic disease contributors to laryngeal pathology, disorders of voice use, or idiopathic voice disorders.⁴⁵ From the two-category voice disorder classification system to the five-category voice disorder classification system, and many other modes of classification in between, these categories are often intertwined as one condition may give rise to another. Since we are most concerned with the audible symptoms of disorders and vocal behaviors that can be detrimental to vocal health, we will be approaching the topic by briefly reviewing the most commonly found voice disorders based on the changes they cause to the structure of

⁴⁴ Sundberg, *The Science*, 182.

⁴⁵ Stemple et al., *Clinical Voice*.

the vocal folds, and the accompanying audible clues. The disorders surveyed as most likely to occur in college aged students are based on findings in the articles discussed in table one, together with Franco et al.'s survey of diagnoses commonly found in professional voice users.⁴⁶ Some neurological impairments that may be more frequently found in singers and various illnesses' impact on the voice will also briefly be covered.

In table 3 (on page 22), the Schematic of Voice Disorders' Location on the Different Layers of the Vocal Folds, disorders listed as occurring at the thyroarytenoid muscle contain vocal pathologies stemming from the nerve supply and/or corresponding muscle activity (with the exception of cysts). Cases that primarily involve muscle tone, such as vocal fold bowing or unilateral vocal fold paresis (depending on the location and nature of the nerve damage), may be successfully addressed with proper medical care and voice therapy. A diagnosis of other disorders resulting from severe nerve damage would lessen chances for full recovery of the singing voice. These include conditions such as spasmodic dysphonia, essential vocal tremor, myasthenia gravis, or vocal fold paralysis. The first three of these disorders are thankfully late in onset, and are therefore generally not a concern for young voice students. Vocal fold paresis or paralysis may, however, be the underlying cause of other disorders manifested at the lamina propria as the vocal structure develops compensatory mechanisms.

⁴⁶ Franco, "Common Diagnoses," 1025-1061.

	<i>Ulcers/Granulomas</i>	Irritation	Sicca	Hemorrhage	Laryngitis	Nodule	Polyp	Cyst	<i>Laryngeal Web</i>	Epithelium	
				Hemorrhage	Laryngitis		Polyp	Cyst		Basement Membrane ↑ Superficial Lamina Propria	
					Laryngitis			Cyst		Intermediate Lamina Propria (w/ Vocal Ligament)	
								Cyst		Deep Lamina Propria	
22		Spasmodic Dysphonia Vocal Fold Bowing		Muscle Tension Dysphonia		Essential Vocal Tremor		(Cyst)		Thyroarytenoid Muscle	
				Unilateral Vocal Fold Paralysis and Paresis Myasthenia Gravis							
	← Arytenoids				→ Anterior Commissure						

Table 3: Schematic of Voice Disorders' Locations on the Different Layers of the Vocal Folds.

The layers of the lamina propria, and more importantly the epithelial cover of the vocal folds host disorders that for the most part are attributable to irritations of the vocal folds and edema. These irritations may stem from repeated use, fatigue, improper use, dehydration, pollutant exposure, gastroesophageal reflux, post-nasal drip, complications from surgery, or a combination of two or more of the above. Fungal or viral laryngitis, cysts, and some carcinoma also may cause these irritations at the superficial layer of the lamina propria or at the epithelium. Looking back at table 2, the symptoms most commonly encountered for a large number of disorders are those of vocal fatigue, hoarseness, loss of flexibility, and effortful vocalizing. All disorders involve irritation at the epithelial layer of the vocal folds, where they may cross the basement membrane, developing into the superficial or intermediate layers of the lamina propria.

As we survey the disorders most commonly found in singers, the majority of those located at the epithelium and upper layers of the lamina propria are the result of hyperfunctional behavior at the phonatory level.⁴⁷ While the condition may be exacerbated by laryngeal behavior, predisposing factors are often contributors to the rise of a disorder. Adequate awareness and implementation of vocal hygiene measures can therefore help ward-off the development of voice disorders.

A brief review of the most common disorders in singers will be surveyed next. The list of disorders and pertinent information are drawn from the studies referred to in

⁴⁷ Stemple et al., “Electromyographic Biofeedback,” 471–476.

Table 1, together with Franco's "Common Diagnoses and Treatments for Professional Voice Users,"⁴⁸ and Gates' *The Owner's Manual to the Voice*.⁴⁹

STRUCTURAL CHANGES OF THE VOCAL FOLDS AND DISORDERS OF VOICE USE

Traumatic Laryngitis (non-fungal or bacterial laryngitis, otherwise known as acute laryngitis) **and Edema** are caused by the predisposing factors just discussed, along with vocal fatigue from overuse or abuse. The voice may tire more quickly, require a longer time to warm-up, it may present with a raspy quality, there may be the feeling of a sore throat, accompanied by a loss of flexibility and range. Laryngitis, an inflammation of the vocal folds, often results in a complete loss of voice, or aphonia.⁵⁰

Vascular Ecstasia is caused by dilated capillaries, which may be caused by irritation, hormonal changes, or dehydration. The voice becomes less flexible, tires easily, and may lose some range. It can also be asymptomatic.⁵¹

Vocal Hemorrhage results after trauma causes the rupture of a capillary, resulting in bleeding. Traumatic events that qualify here are extreme yelling (such as in a particularly noisy environment, such as during a game or concert), coughing, extensive throat clearing, or singing vocally tasking repertoire without properly warming up. The

⁴⁸ Franco, "Common Diagnoses," 1025-1061.

⁴⁹ Gates, *Owner's Manual*, 112-156.

⁵⁰ *Ibid.*, 114-118.

⁵¹ Franco, "Common Diagnoses," 1046-1050.

instance of hemorrhage is often felt as a *pop*, and acute dysphonia or aphonia follows immediately after.⁵²

Polyps are formed by a capillary hemorrhage, and result in swelling of the epithelium, sometimes including the superficial layer of the lamina propria. They most often occur unilaterally and are fluid filled. The swelling may be in the form of a protruding “bubble” or be along the edge of a fold. They occur and are manifested in much the same way as vocal hemorrhages. Diplophonia may also occur depending on the location of the polyp, and when a polypoid, or an engorged vocal fold mass operates out of phase with its paired vocal fold.⁵³

Nodules occur through repeated vocally abusive behaviors. They most often occur bilaterally about 1/3rd the distance from the anterior commissure, where vocal impact is greatest on adduction. Because of their location and density, they often are accompanied by a breathy sound resulting from incomplete closure of the vocal folds, and reduce the upper range, making phonating on high pianissimi nearly impossible.⁵⁴

Laryngeal Papilloma- Human Papilloma Viruses (HPV) may cause Laryngeal Papilloma. They are airborne or sexually transmitted, and may cause recurring wart-like growths on the vocal folds that may require surgical removal. These may manifest

⁵² Gates, *Owner's Manual*, 119-120.

⁵³ *Ibid.*, 128-131.

⁵⁴ *Ibid.*, 122-125.

themselves by a hoarse voice and breathy tone, along with a change in timbre and audible breathing.⁵⁵

Vocal Fold Bowing- One or both vocal folds atrophy as a result of loss of muscle bulk. In young singers, this may be caused by long periods of voice rest following rather active periods, and after an illness or intubation. This may also be a sign of an underlying condition, such as rheumatoid arthritis, or loss of nerve input to the vocal folds. It is audible by a breathy sound caused by incomplete closure of the folds, or a weak voice lacking in amplitude.⁵⁶

Muscle Tension Dysphonia (MTD) is a disorder indicating vocal hyperfunction that leads to less than optimal phonation. It often results from over-compensation to mask one or more underlying disorders, such as paresis, a nodule or polyp, and complications from upper respiratory ailments. It can manifest itself in rapid vocal fatigue, effortful voicing, hoarseness and loss of range.⁵⁷

VOICE THERAPY FOR STRUCTURAL CHANGES OF THE VOCAL FOLDS AND DISORDERS OF VOICE USE

If any of the above-mentioned disorders is suspected, it is imperative that teachers urge their students to seek out a medical diagnosis and management. Students should be advised to rest vocally, and abstain (if not prescribed by a physician) from taking blood-thinning medication such as aspirin in the event a vocal hemorrhage or polyp could be the

⁵⁵ Gates, *Owner's Manual*, 144-146.

⁵⁶ *Ibid.*, 133-136.

⁵⁷ *Ibid.*, 146-148.

culprit, or if there is a sudden onset of aphonia.⁵⁸ Depending on the disorder, treatment may involve surgical intervention, together with voice therapy to reduce the offending behavior and the risk of reoccurrence.

When addressing disorders of voice use and structural changes of the vocal folds resulting from faulty vocal behavior, voice therapy usually involves instructions regarding voice hygiene and vocal tasking together with a form of therapy. Vocal tasking refers to the extent and manner of voice use speakers and singers subject themselves to. Therapies' goals in general are to reduce tension at the laryngeal level, activate proper breath management and coordination during voicing, producing more efficient and effortless but mindful voicing. Depending on the disorder, and individual needs and preferences, the various techniques used may include:⁵⁹ **Resonant Voice Therapy (RVT)** to reduce tension at the laryngeal level and promote the least possible vocal impact needed for efficient voicing thus minimizing the risk of injury. RVT promotes a *forward focus* encouraging vibratory sensations in facial bones. Consonants that aid such sensations, such as the nasal continuants /n/ and /m/ are often used to that end. **Vocal Function Exercises** to retrain the muscles of the larynx by encouraging good vocal habits. This method encourages stretching and healthy strengthening of the laryngeal muscles, advising the use of low dynamics and supported sounds through repetitions of held tones and range-encompassing glides. **Confidential Voice Therapy** is most effective for patients with extreme voice adduction, who have acquired compensatory

⁵⁸ Ibid., 167.

⁵⁹ Abbott, *Vocologist's Guide*.

mechanisms of pressed voicing that may have developed after a vocal fold lesion such as a nodule or polyp. It may also be used for patients with Muscle Tension Dysphonia. It involves producing speech at a very low dynamic, encouraging a breathy tone, then gradually building up to normal voicing. **The Accent Method** is helpful for patients who have a habit of disconnecting from their airflow, resulting in an unsupported tone, audible during onset, offset, or sustained voicing. It is based on a rhythmic approach to speech, focusing on speech flow, changes in dynamics, and accompanying abdominal movements. There are many other therapies available, such as biofeedback and laryngeal massage, a discussion of which is beyond the scope of this document.⁶⁰

Voice teachers may note that the root goals of these therapies are closely associated to singing principles and general concepts broached in the voice studio.

NEUROGENIC VOICE DISORDERS

Vocal fold paralysis or paresis occurs as a result of damage to the recurrent laryngeal nerve, or the superior laryngeal nerve. It can be congenital, acquired post surgical intervention, be caused by a tumor, be termed idiopathic, or can sometimes occur in the aftermath of an upper respiratory infection. It manifests itself through a breathy tone, pitch breaks, difficulty phonating in the upper or lower register, inability to phonate for long periods of time without strain, and reduced ability holding a note for a long period of time. Depending on the location and severity of the damage, it can be quite difficult to detect without direct visualization, especially when it is congenital as there is

⁶⁰ Ibid.

no point of before/after comparison. Changes for recovery are much greater with paresis than paralysis.⁶¹

OTHER ILLNESSES CONTRIBUTING TO LARYNGEAL PATHOLOGY⁶²

Gastroesophageal reflux. As mentioned earlier, gastric acid mounting up the esophagus to the level of the larynx causes swelling of the arytenoids and at the vocal processes of the vocal folds, irritating the epithelium, sometimes leading to **contact ulcers** and **granulomas**.

Allergies/a cold/sinus infections. Post-nasal drip causes similar reactions to those of Gastroesophageal reflux. Furthermore, singers often *sing through them*, giving rise to more complications.

Asthma. Dryness and coughing from asthma causes trauma to the vocal folds. Steroid inhaler use can increase the dryness as well as give rise to **candida overgrowth** on, or around the vocal tract and folds.

Upper respiratory infections. Coughing that usually accompanies upper respiratory infections may cause vocal trauma leading to **traumatic laryngitis, hemorrhages, and polyps**.

Classically trained singers are required to have voices with clear onsets and offsets, a pleasant, clear, and vibrant tone that matches the stylistic needs of the repertoire to be sung, pitch variation and control, dynamic contrast across the pitch range, the ability to sing long, fluid lines, as well as a certain amount of flexibility, depending on

⁶¹ Gates, *Owner's Manual*, 148-153.

voice type. At the college and certainly by graduate level, voice students should have enough vocal stamina to fulfill curriculum requirements. These involve the production of forty-five minute to hour-long concert, participating in rehearsals, singing an entire role appropriate to the student's vocal readiness and voice type.

As we reflect upon the tasks singers require of their vocal folds and the symptoms mentioned in the discussion here above as well as in table 3, detecting a vocal problem would seem an easy task. Many of these symptoms may also be apparent in a student who hasn't yet mastered the art of coordinating the various components of their vocal mechanism, settled into their voice type, or reached an appropriate level of comfort in their repertoire. The usual vocal fatigue also encountered by a student who is managing a stressful schedule and/or seasonal allergies may also mask (as well as contribute to) more serious problems. Yet voice teachers can hardly recommend vocal rest at every instance of fatigue, for if that were the case, vocal progress across students' academic career would be quite stagnant! We should instead arm teachers with as many tools as possible, whether it is to help students in being more aware of their vocal mechanisms, mindful of vocal hygiene, speaking habits, daily vocal loads, etc. Furthermore, teachers should have clear, appropriate diagnostic tools, know what to listen for, and have a plan to address any problems.

CHAPTER 2: THE SINGER'S VOICE

To better recognize the symptoms of voice disorders that may manifest themselves in singing, we should understand the source of sound we identify as voice. We will briefly therefore discuss the structure of the different layers of the vocal folds together with fundamental concepts of the singing voice. Our guide to recognizing and addressing symptoms indicative of voice disorders relies on a thorough understanding of these factors.

STRUCTURE OF THE VOCAL FOLDS

The base of the folds is the thyroarytenoid muscle. It extends, as the name suggests, from the thyroid cartilage to insert into the arytenoid cartilages. There are then three layers of the lamina propria: the deep, intermediate, and superficial layers. The deep layer is just above the thyroarytenoid muscle, the intermediate contains the vocal ligament, and the superficial rests above, separated from the epithelium by the protective layer of the basement membrane. Varying viscosities differentiate the three layers of the lamina propria, with the deep layer having a much denser viscosity that gradually diminishes from layer to layer to the top. This allows for a fluid, free movement of the lamina propria over the main body of the vocal folds. This movement is aided by the

cover of the folds, or the epithelia, which are bathed in protective mucus, ensuring the smooth, supple colliding of vocal folds under aerodynamic forces.⁶³

VOCAL FOLD MOVEMENT

A fine interplay of muscular events within the larynx coupled with the multi-layered body/cover properties of the vocal folds and air pressure forces both below and above them result in phonation. The thyroarytenoid muscle shortens and thickens the vocal folds to create a lowering of pitches, while the cricothyroid muscle aids in lengthening and thinning the folds to raise pitch. Intensity control is achieved through an increase in contact mass of the vocal folds, achieved by contraction of the thyroarytenoid muscle, together with an increase in air pressure for louder voice. This is, of course, an over-simplified explanation of a very intricate process, where many other factors are in effect.⁶⁴ There are various muscular structures extrinsic to the larynx that are either directly or indirectly connected to it, and that often fulfill other functions such as aiding in posture, masticating, swallowing, etc. These muscles may also elevate or depress the larynx, although the majority of them apply to the former.

Innervation of the larynx is provided by two branches of the vagus nerve: the superior laryngeal nerve innervates the cricothyroid muscle and is therefore responsible for pitch elevation, while the recurrent laryngeal nerve innervates the remainder, thus controlling lower pitches by innervating the thyroarytenoid muscle. The recurrent

⁶³ McCoy, *Your Voice*, 103-105.

⁶⁴ McCoy, *Your Voice*, 2012.

laryngeal nerve is also responsible for vocal fold adduction and abduction via for innervation of the interarytenoid and lateral and posterior cricoarytenoid muscles.⁶⁵

We can now begin to comprehend how intricate voicing is. There is a web of structures, muscles, and systems interconnected to each other. Voice teachers have the complicated task of transmitting a good vocal technique when the very instrument they are teaching is invisible to all but voice clinicians! We can also begin to understand how impairment in any of the aforementioned structures may impact the larynx's functioning as a vital organ accomplishing intricate musical feats.

THE SYSTEM OF VOICING

Originating with the intake of air, and therefore the system of **respiration**, **phonation** occurs as air pressure, combined with the myo-elastic properties of the vocal folds causes the vocal folds to oscillate. The sound produced at the source travels through the vocal tract, into an area of **resonance**. Through its various configurations and properties, this area of resonance filters out some harmonics, making some stand out and damping others, depending on the location of formants. to create the various vowels and consonants the oropharynx is capable of producing in the system of **articulation**. Voicing for artful singing relies on the same principles, refining the coordination between systems to a learned skill.

RESPIRATION

Various theories on respiration for singing have evolved among voice pedagogues over time.⁶⁶ These often advocate one mode of breathing versus another. In my

⁶⁵ Titze, *Principles of Voice*, 20-21.

observations, many successful singers are known to have managed different approaches to respiration quite successfully. The basic principle of respiration as it relates to phonation is that of providing enough controlled breath pressure at the glottis to produce efficient voicing. Appropriate air pressure is achieved through a balance of muscular antagonism between the muscles of inspiration and those of exhalation.⁶⁷ In singing, this air pressure would serve the glottis through a range of glottal configurations such as onset, offset, sustained phonation, and pitch and amplitude variations. An active, energized but not overly pressurized system of well managed cycles of air intake and release should permit singers to sing relatively long phrases, provided there is good coordination with the phonatory system. The biggest culprits of respiration issues in singing are an overly rigid, or hyperfunctional, or a lax, hypofunctional support mechanism where the muscular antagonism needed to create adequate subglottal air pressure is imbalanced. In the overly rigid configuration, singers push the breath out forcefully through a resisting glottis, resulting in a *locked* sound. This may also occur in instances where singers have the reflex of filling so much air on the inhalation then holding it in what feels like “tanking up,”⁶⁸ causing pressed phonation and glottal onsets. Lax exhalation results in air being pushed out as well, causing a breathy sound.⁶⁹ We will discover in the next section that both these problems, though originating at the respiration

⁶⁶ McCoy, *Your Voice*, 88-91.

⁶⁷ Ibid.

⁶⁸ Miller, *Solutions*, 21.

⁶⁹ McKinney, *Diagnosis and Correction*, 60-64.

phase, are indicators of phonation issues, since what concerns us is the air pressure supplied moving air through the glottis during phonation.

PHONATION

Phonation operates under the prompting of air pressure and laryngeal control. As breath pressure causes the adducted vocal folds to oscillate, sound is initiated. A combination of strongly adducted vocal folds with ensuing excessive air pressure will result in an explosive release of air heard as a glottal onset. This mode of phonation, when maintained through held phonation, results in a pressed sound that is the initial cause of many voice disorders.⁷⁰

Also worrisome is a breathy onset, where a lack of laryngeal control delays the approximation of the folds under a delayed application of the Bernoulli effect. This will cause the folds to stay separated before the beginning of an audible tone, letting air escape through the glottis. Maintaining hypofunctional phonation throughout held tones creates a breathy, weak sound. Asserting just enough laryngeal control at the glottis with a healthy amount of air pressure to produce efficient phonation is a learned skill.⁷¹ This allows the vocal folds to explore a range of athletic vocal motions required by singers through long phrases, vocally agile or legato passages, variations in pitch and volume, and negotiations through registration events.

The vocal folds elongate for higher pitches, stretching to only bring the medial edges of the folds to vibrate. In this configuration, the singer requires enough air pressure

⁷⁰ McCoy, *Your Voice*, 112-113.

⁷¹ Ibid.

and laryngeal control to maintain voicing through less contact area. The glottis will in fact release more air at higher pitches, as there is less contact area between the vocal folds. The common misconception is that singers would need to push more air through the glottis to achieve this, while this may in fact have the reverse effect as the glottis responds by protecting the airway and increasing contact area, making higher pitches difficult to attain.

The production mode for higher pitches in the female voice is cricothyroid dominant. This muscle is associated with elongating the folds resulting in a decrease of contact surface between the folds. Comprising the body of the vocal folds, the thyroarytenoid muscle is responsible for shortening and thickening the vocal folds, increasing their contact area. Thyroarytenoid dominant voice production is the primary mode of phonation throughout much of the male voice (except for falsetto). This muscle is also responsible for women's lower register. Maintaining a sense of tonus and support will help achieve the requisite subglottal air pressure and laryngeal control to allow for pitch flexibility along singers' range, together with resonance and registration events, which we will explore shortly.

An increase in the amplitude of harmonics results from an increased contact area between the folds. An increase in air pressure and glottal adductory tension is required to bring the folds together to increase amplitudes while maintaining pitch. We can then see how respiration, or breath pressure, and laryngeal control work together to achieve changes in pitch and volume.⁷²

⁷² Ibid.

To summarize, a breathy sound may be caused by insufficient breath pressure, lack of glottal resistance, or the presence of a glottal chink just as it may be caused by vocal folds that do not close properly because of the presence of a nodule, cyst, polyp, or just fatigued folds. In the same way, a pressed tone could be the cause of excessive breath pressure, an over-adducted glottis, or a condition such as muscle tension dysphonia, where laryngeal musculature is over-active. Someone unable to alter volume or pitch, or have limitations in them may either not have yet developed the requisite breath pressure/glottal resistance coordination required or be inflicted by a range of disorders reducing the ability of the folds to perform changes in pitch and dynamics.

Moving on to the interaction between phonation and resonance, Titze explains the factors needed for optimum vocal fold oscillation in the “oscillator-resonator coupling theory.”⁷³ Singers need:

- 1) Adequate hydration in vocal fold tissues
- 2) Freedom of articulators and larynx
- 3) Habituating free and effortless voice initiation and release.⁷⁴

⁷³ Titze, *Principles of Voice*, 113-117.

⁷⁴ McCoy, *Your Voice*, 112-113.

RESONANCE

As sounds travel through the vocal tract, they gain amplitude and change in timbre. Some harmonics are amplified while others are damped through the phenomenon of formants, or resonators of the vocal tract. Formant frequencies change as a function of modifications in the shape of the vocal tract through movement of the tongue, lip shape, jaw opening, larynx positioning, and presence or absence of nasality. Resonance relevant to the phenomenon just described happens freely. Singers should be mindful so as not to hamper free resonance, which is responsible for sound intensification and enhancement,⁷⁵ by unnecessary nasality or damping.⁷⁶ Forced resonance, on the other hand, can aid in singers' kinesthetic understanding of the voice through identifying specific sympathetic vibrations. Allowing for free, forward resonance liberates many stresses put upon the vocal system. There is a widespread pedagogic practice of advocating the use of sympathetic vibrations, together with the use of specific consonant/vowel combinations in vocalize to encourage singers' sensory understanding of the resonant voice.⁷⁷ There is indeed a resonance-focused exercise developed for singers by Lessac and applied to voice therapy by Verdolini focusing on this concept.⁷⁸ It is used for a multitude of voice disorders where hyperfunctional voice production places undue stress on the larynx and

⁷⁵ Ibid, 27.

⁷⁶ Sundberg, *The Science*, 12.

⁷⁷ Miller, *Solutions*, 68-70.

⁷⁸ Abbott, *Vocologist's Guide*.

vocal folds, with the aim of reducing laryngeal adduction to produce most efficient voicing with as little contact area as possible.⁷⁹ Titze has developed another concept of voice training through resonance, with the idea of the semi-occluded vocal tract.⁸⁰ This is accomplished through lip trills, tongue trills, phonation into straws, etc. Use of the semi-occluded vocal tract produces:

“a semi-occlusion in the front of the vocal tract, heightens the source-tract interaction by raising the mean supraglottal and intraglottal pressures. Impedance matching by vocal fold adduction and epilarynx tube narrowing can then make the voice more efficient and more economic in terms of tissue collision.”⁸¹

Resonant Voice Therapy may also be used for hypofunctional voice production by encouraging forward sensations thus encouraging vocal fold approximation.

We shall extend on our understanding of Resonance through later discussion of Registration, which is closely related to resonance effects. But let us first look at the system of Articulation, for we shall find it useful for our future discussion on registration.

ARTICULATION

The mechanisms responsible for articulation are necessary to singing as they are responsible for making language intelligible. The tongue, jaw, lips, palate and pharynx all aid in making various consonants and vowels. Unfortunately, they are also the crossways for a multitude of muscles connected to the larynx either directly through extrinsic laryngeal musculature, or through the hyoid bone, thus affecting larynx height and adding

⁷⁹ Verdolini et al., “Laryngeal Adduction.”

⁸⁰ Titze, “Voice Training,” 448-459.

⁸¹ Ibid.

to laryngeal stress. This explains why singers are encouraged to develop a feeling of relaxation and freedom of articulation. While manipulation of the larynx through pharyngeal constrictor muscles is undesirable, some effects relating to vowel modification and formant tuning may aid in larynx lowering. Rounding the lips and slightly closing the jaw extends the vocal tract ever so slightly, while spreading the lips as in a smile, narrowing the back of the throat, or dropping the jaw achieves the contrary. We shall find these possibilities of modifying vocal tract length and shape useful as we delve further into a discussion of registration.⁸² I encourage singers to explore the wide range of articulatory possibilities. They should then revise their choices for articulation to minimize excess tension and laryngeal involvement while facilitating vowel modifications for registration events.

REGISTRATION

Our last two conversations on resonance and articulation lead us into our explanation of registration. Unless otherwise noted, this discussion shall rest on a thorough explanation on registration offered by McCoy.⁸³

Naming the various registers of the voice proves to often be a great area of confusion in semantics, as every pedagogue has different interchangeable terms. McCoy facilitates the task by using a system developed by Roubeau to Mode 1 and Mode 2. Mode 1 is thyroarytenoid dominant, and characterized by a significant vertical phase difference, or an asymmetrical opening of the bottom vs. the top layers of the vocal folds.

⁸² McCoy, *Your Voice*, 158-164.

⁸³ McCoy, *Your Voice*, 143-157

Men use Mode 1 voice production through most of their registers (except falsetto), making their switch from register to register more of a resonance effect, as the source of production does not change. Women use it in classical singing for chest voice, switching to Mode 2 around C4-F4 at the primo passaggio and through the remainder of their range. Mode 2 is then cricothyroid dominant, with a small or non-existent vertical phase difference. The vocal folds are elongated in M2, operating on their medial edges. This is why singing in this setting is a great analytical tool in detecting vocal fold swelling or fatigue, as edematous folds will not vibrate smoothly. If one chord is more swollen or heavier than the other, they will vibrate out of sync, resulting in vertical phase difference and hoarseness. Voicing will also be harder to achieve, vocal fold approximation can then be more effortful, making voicing more laborious. A vocal fold lesion will also result in breathiness, and sometimes diplophonia, as the vibrating portions of the folds are divided into two vibrating units as a result of a protruding lesion, such as a polyp.

Returning to register shifts and their management:

Men transition through their primo passaggio somewhere between F3-C4. The singer's solution to negotiating the transition is to lower the larynx so as to allow for higher frequencies. This should be a rather effortless transition, hopefully acquired early on in students' vocal studies so as to be able to negotiate the remainder of their range. The secondo passaggio in a man's voice, occurring somewhere between C4-A4, is a matter of finding the ideal vowel to specific pitches to allow for formant tuning. This is where the famous notion of *covering* comes in. The goal is to keep the larynx in a relatively low configuration. As mentioned earlier, singers prepare for more closed

vowels by increasing the length of the vocal tract before the occurrence of the passaggio. Thus, a flawless transition is achieved. When not caused by a vocal fold lesion or fatigue, a yelling, cracking sound in register transitions and up the higher range of a male is a result of actions that support lifting the larynx or spreading the vowel, i.e. not using the idea of *cover*. Many beginning tenors may achieve this by staying *true to the vowel*, thus maintaining the shape of an open vowel through the passaggio. While it may not crack immediately, discomfort and eventual sound perturbation may occur.

As women shift from Mode 1 to Mode 2 in their primo passaggio, a change in vocal configuration requires adequate breath support, avoiding the pitfall of providing excess air pressure. A modification in vowel shape also aids this transition as that of men in their secondo passaggio, opting for closer vowels. Women reach their secondo passaggio between E5 and A5. They are here already in Mode 2, and therefore require more resonance change, modifying vowels here and above the 2nd passaggio to an open vowel such as /a/ or an open /o/. The use of neutral, often-unintelligible vowels such as a wide schwa might also be beneficial. The idea is to lower the larynx, dropping the jaw to aid in lowering the larynx, thus avoiding a shrill, yelling sound.

Chapter 3: VOICE HYGIENE

As seen in chapter 1, proper voice care aimed at preserving the fluid, myoelastic properties of the vocal folds aids immensely in warding off potential lesions. Such measures require strict adherence to voice hygiene guidelines. These aim to keep the folds hydrated, ward off irritation and inflammation, reduce vocally abusive behaviors, reduce students' daily vocal load, instill good vocal practice habits, and maintain good overall health. Information pertaining to the various areas of vocal hygiene will be discussed later in this chapter. For now, let us consider singing students' knowledge of voice hygiene measures.

VOICE STUDENTS' KNOWLEDGE OF VOICE HYGIENE

A study by Kwak et al. found 82.9% to 94% of Undergraduate, Master's, Doctoral and Young Artist students to reach out primarily to their voice teacher as their "most valuable source of education for vocal care."⁸⁴ While the study noted their satisfactory overall knowledge of vocal anatomy and physiology, care of the vocal mechanism, and voice disorders, the authors noted that more advanced students did not have significantly greater knowledge and feared visits to the laryngologist. Meanwhile, in

⁸⁴ Kwak et al., "Knowledge," 191-195.

a study noting the incidence of Upper Respiratory Tract Infections, or URTIs, Zimmer-Nowicka et al. found the rates of URTIs to have decreased throughout voice students' vocal studies.⁸⁵ According to the authors, URTIs are seen to be a major contributing factor to dysphonia in voice students, caused by lack of adherence to vocal hygiene guidelines. The fact that the rate of incidence of URTIs seems to diminish as students progress through studies is thought to be the result of "increased awareness of vocal hygiene through voice education"⁸⁶ together with singing experience. The authors also suggest that voice students receive vocal hygiene counseling earlier in their studies. Drawing on these studies together with personal experience both teaching and as a voice student in universities, I note the need for a course covering voice hygiene to be offered in universities offering voice degrees to be required at the onset of studies. While such information may be too broad and lengthy to properly be addressed during voice lessons at the care of the private voice instructor, it could, in the absence of a course, be part of a more "passive" curriculum in the voice studio. As an alternative, I propose for the contents of such a program to be included in a series of *take home* exercises. Students would be made aware of behaviors relating to voice hygiene, at the rate of one behavior a week, so as to remember and retrain that behavior in the future. Keidar suggests keeping a personal voice care journal containing pertinent information regarding voice use, illness, hydration, and irritant exposure.⁸⁷ This can be an additional aid in recording

⁸⁵ Zimmer-Nowicka, "Incidence and Predisposing Factors," 505-510.

⁸⁶ Ibid

⁸⁷ Keidar "Self-Screening," 355-66.

vocal care behaviors. Drawing and expanding on Keidar's aforementioned suggestion for a journal, readers will find a template for a *Daily Voice Health Log* in Table 4 (on page 46). In reason of the personal nature of some of these questions, it may be a journal that students are required to keep on their own, in a user-friendly format. Should the teacher prefer to verify adherence to journal keeping, students may choose to record more personal information, such as medications, medical conditions, emotional state, and the such on a separate, confidential log.

VOICE HYGIENE

HYDRATION

As previously discussed, keeping the vocal folds and vocal tract well hydrated is crucial to the efficient and healthful functioning of the vocal mechanism. This allows for optimal voicing as aerodynamic events and the myoelastic properties of the vocal folds produce sound, together with allowing a supple interaction between the vocal folds and the resonating space of the oropharynx. Adequate hydration also aids in warding off or diminishing the duration of respiratory illnesses, together with aiding in the prevention of vocal fatigue⁸⁸. Unless otherwise noted, the voice hygiene guidelines noted here below are based on Gates' *Owner's Manual to the Voice*.⁸⁹

⁸⁸ Gates, *The Owner's Manual*, 34-38.

⁸⁹ *Ibid*, 25-55, 157-175.

DATE:				
ACTIVITY	REPERTOIRE OR TYPE	TIME	LENGTH OF TIME OR DOSAGE	HOW DID IT FEEL?
Coaching				
Voice Lesson				
Rehearsal				
Rehearsal				
Ensemble work				
Ensemble work				
Audition				
Warm-up				
Practice time				
Practice time				
Practice time				
Estimate of net talking time				
Prescription Medications				
OTC Medications/supplements				
Allergy symptoms				
Reflux				
Illness				
Water consumption (# of cups or oz)				
Coffee (# of cups or oz)				
Alcohol (type & # of cups or oz)				
Emotional State				
Number of hours of sleep				
Other				
Other				
Other				
Other				
Nutrition				

Table 4: Daily Voice Health Log

Water intake. To ensure good hydration, students should consume enough drinking water throughout the day. A good gage of proper hydration is to “pee pale.”⁹⁰

Alcohol intake. Along with any other possibly dehydrating beverages, alcohol intake should be kept to a minimum as it can lead to acid reflux and dehydration.

Medications. When taking both prescription or over the counter medication, it is advisable to consult with one’s doctor or pharmacist to determine possible side effects and contraindications. There can be serious consequences from mixing prescriptions with self-medicated over the counter treatments. Certain forms of decongestants, cough suppressants, sleep aids, allergy medication, diuretics, inhalers, anti-psychotic and anti-depressant drugs may cause dehydration. Antibiotics may mask or give rise to fungal infections. Mood stabilizing medications may sedate and alter performance. Blood thinners increase the risks of hemorrhages. Various medications, including many antibiotics may have acid reflux side effects. Hormone therapy medications, including some birth control pills, may cause fluid retention, swollen vocal folds, and alter the timbre of the voice. Students should inquire about the best way to reduce these side effects when no alternate drug is available. Alternate options should be sought out when possible, and drugs benefits should be weighed out against their side effects. Teachers are urged to instruct their students on the importance of discussing their needs as singers, and to avoid these side effects with their primary care physician, as well as any other specialists who are likely to prescribe medication.

⁹⁰ Ibid., 60.

Dry environments should be avoided both for preserving the humidity of the vocal apparatus together with fending off upper respiratory infections. Singers should have a humidity meter, and invest in a cool-mist humidifier especially during cold winter months. Care should be taken when traveling in airplanes.⁹¹

IRRITATION/INFLAMMATION

Irritation and inflammation of the vocal folds reduce the fluid properties of the epithelial cells covering the vocal folds, and may predispose singers to a slew of voice disorders.

Smoking and pollutants/chemical irritants. Singers should abstain from smoking, from living in areas with poor air quality, or working with irritants. Smoking strips the vocal fold cover of its protective layer of mucus, altering the properties of the epithelium, thus affecting the very source of phonation. Vocalizing becomes much more effortful. This can lead to irritation of the vocal fold, and give rise to vocal fold varixes, edema, nodules, and cysts. First and second hand smoke may also be causative factors in cancers of the mouth, larynx or lungs. It is thus imperative that students abstain from first and second hand smoke, together with exposure to pollutants and chemical irritants.

Allergies/Sinus Infections/Cold. Postnasal drip can be a significant irritant descending down the back of the vocal tract and affecting the vocal processes. It can also cause inflammation of the arytenoids and accompanying structures, including the surface of the back of the vocal folds. While it may not be consciously felt, a habit of throat clearing may frequently accompany this phenomenon.

⁹¹ Ibid, 37-38.

Upper Respiratory Infection/Cough. The phono-trauma that accompanies coughs together with dehydration, general muscle weakness and fatigue may cause extensive irritation to the vocal folds. Medications taken to address upper-respiratory infections often contain a cocktail of drugs meant to clear symptoms, which, unfortunately, also cause dehydration. Students are urged to check with their doctor or pharmacist to identify dehydrating components of these drugs. Bacterial infections are often treated with a course of antibiotics that may aggravate symptoms of GERD or LPR.

Gastroesophageal reflux and Laryngopharyngeal Reflux (GERD or LPR) produces results similar to the effects of post-nasal drip in the inflammation and irritation of the back of the larynx, the vocal processes, and the back of the vocal folds. Spicy/acidic foods, acidity inducing drugs, abdominal weight, wearing tight clothing, and late night eating may all contribute to the symptoms of GERD or LPR. If it is suspected, singers should consult and be under the care of a physician.

VOICE BEHAVIOR

The vocally abusive behaviors listed here below should be avoided so as to preserve singing students' vocal health:

Speaking voice. Avoid high-pitched, glottal fry, unsupported speaking, speaking too loud, and extraneous tension of the articulators. Most people, including singers, spend the majority of their vocal load speaking rather than singing. Singers' spoken voice should be well placed, supported, and free of strain on the vocal mechanism. They should

review their speaking mannerisms so as to promote healthy every day voicing. Singers may also benefit from finding their optimal speaking pitch.⁹²

Whispering. Many individuals have the mistaken notion that whispering when faced with vocal discomfort is preferable to normal voicing. This is in fact not the case! Whispering has a drying effect and causes extensive strain on the larynx, sometimes even engaging the false vocal folds.

Yelling, Screaming, loud speaking, exposure to background noise. When engaging in these forceful modes of phonation, the vocal fold contact area is increased, and more breath pressure and glottal tension is required to produce higher amplitudes. This is often not done in a supported, conscious manner, extrinsic musculature may get involved to aid in increasing volume, and damaging mechanical vocal fold collisions may ensue. Singers should be especially mindful to preserve normal speaking amplitude when in crowded, noisy areas, so as not compete with background noise.

Throat Clearing and Coughing. A simple reflex to clear one's airway, these behaviors may develop into an unconscious, vocally harmful habit that may cause unnecessary vocal trauma. Singers are advised to drink water to avoid developing the habit of throat clearing, together with identifying and remedying the source of irritation. This could emanate from post-nasal drip, irritation from acid reflux, and thickened mucus caused by dehydration.

⁹² Ibid, 45.

VOCAL LOAD MANAGEMENT

As part of their academic work, voice students are vocally active during voice lessons, coachings, ensemble classes, practicing, and performing. They also engage in social discourse, and might have vocally demanding part-time jobs, or assistantships.

Studies examining vocal load habits of voice performance students show that important information regarding daily voice use may be gleaned from the use of a portable vocal dosimetry device. When comparing the voice dosimetry information of students enrolled in voice performance, music education, and music theater programs, Gaskill⁹³ noted the need to quantify daily vocal load limits. Surveying a small number of studies concentrating on voice students, most are based on a too few students to arrive at conclusions on vocal load limitations. Furthermore, Gaskill notes:

“We are still along way from fully quantifying these limits for any particular vocal user or vocally demanding profession, or for different genres of singing. There are presumably numerous individual factors, including both inherent vocal fold physiology an behavioral patterns, that influence the development of either temporary or chronic vocal fold tissue fatigue, vocal fold inflammation or actual vocal fold tissue injury.”⁹⁴

Notice personal limits. Students should know their own personal limits, reducing practice to short, efficient sessions, especially at the onset of study.

Vocally demanding jobs. If possible, these should be avoided, or managed with conscientious care for their voice.

Marking. Teachers should advise students on when and how to mark (singing quietly or sparingly to preserve the voice). Singers should mark when they feel vocally

⁹³ Gaskill, “Comparing the Vocal Dose,” 11-19.

⁹⁴ Ibid., 19.

tired, when their schedule for the day involves a lot of singing, and/or when rehearsals are long and vocally taxing, and it is permissible to do so. Richard Miller suggests singing passages lying at the extremes of a singer's range an octave higher or lower than marked, and singing entrances at audible levels, while the remainder of a rehearsal may be sung at less than full voice, but always with a supported sound.⁹⁵

VOICE REGIMEN: SINGING

Voice students should commence each day getting their voices ready for a day of singing. As soon as they feel ready to, and before their first rehearsal of the day, time should be spent warming-up the voice, starting with easy vocalizing, moving on to exploring the full range of pitches, dynamics, and agility appropriate to the voice type.

Warm-up/cool downs should further be included, if briefly, before each rehearsal/practice session. Warm-ups should be appropriately suited to the repertoire at hand. The principle that lies behind the notion of warming-up/cooling down is similar to that of athletes needing to warm-up their bodies before daily practice to reduce injury.

Daily technique work to remember and apply concepts worked on in the voice studio.

Active singing, correct posture. Students should be mindful to maintain good posture and a supported sound during every day practice, together with ensemble rehearsals. Incorrect posture may cause disconnection with one's support mechanism, place undesired stress on the extrinsic musculature of the larynx thus affecting laryngeal height, and may be the culprit in a multitude of voice symptoms.

⁹⁵ Miller, *The Structure of Singing*, 222.

Avoid excess tension, be aware of how something feels, and stop when it doesn't feel right. At the onset of voice studies, it is normal for students to explore various concepts as they learn to interpret the information shared by their teacher and coaches. They may, and should be encouraged to experiment with various concepts, but should keep aware of how things feel, and know to stop should they sense tension or discomfort to prevent negative muscle memory.

GENERAL WELL-BEING

Singers are vocal athletes dependent on their entire bodies and health. Illness sets students' progress back, affecting singers' potential for success. It is therefore important to:

Be physically active. Singers are required to look pleasing on stage, be able to move and dance, and feel dynamic and energetic.

Maintain a healthy weight/get adequate nutrition. Both are important for general well being, as well as maintaining a good image for auditions and performances.

Get adequate amounts of sleep and rest, manage stress. The vocal mechanism needs recuperation and rest time much like all of our bodies' systems. Managing stress is a necessary skill to acquire as voice students navigate a demanding academic and performance life.

Practice safe sex. Human papilloma virus (HPV) is one of many sexually transmitted diseases that can affect the vocal folds. HPV lesions can be debilitating and prevent airway passage. This can result in the need for repetitive surgeries that cause scarring and limit students' possibility for a career in singing. On rare occasions, some

strains of HPV may result in leukoplakia and laryngeal carcinoma. It is thus imperative that singers practice safe oral hygiene and sexual practices.

Wash hands frequently to ward off common viruses.

Obtain immunization against the flu to increase students' chances of staying healthy during flu season.

Wear seat belts to prevent laryngeal trauma caused by car impact.⁹⁶

Be mindful of singing during menstruation. Water retention and thinning blood may affect the vocal folds in some women, negatively influencing laryngeal movement as well as increasing chances of hemorrhage. While students may not be able to completely halt singing activity, it is important to be aware of their predispositions and be careful not to engage in strenuous voicing during these times.

Hearing. Singers should be mindful of changes in hearing, and be advised to wear protective earplugs when exposed to high amplitudes as these may cause irreversible damage to their hearing.

This list of guidelines regarding vocal hygiene measures is by no means exhaustive, but may serve in counseling students and sensitizing them to matters regarding voice care. Even though most of the literature includes information regarding number of hours of sleep (7-8), amount of water intake (8 8oz glasses a day), and so forth, I did not include such information, as personal needs are aleatory. I personally testify to needing a minimum of seven hours of sleep to maintain optimal vocal integrity and decrease chances of vocal fatigue in performance. Yet I have witnessed a colleague

⁹⁶ McCoy, *Your Voice*, 131.

perform flawlessly the entire role of Carmen in a major production with less than three hours of sleep! While this is an ill-advised habit to develop,⁹⁷ there seemed to be no immediate repercussion to her vocal health following the performance. As Sundberg points out:

“The endurance of the phonatory apparatus varies considerably between individuals. Some people cannot manage to perform as long as others, no matter how economically they use their voices; it is not necessarily a sign of a difference in the quality of the vocal technique if singer A cannot sing as much as singer B.”⁹⁸

In voice care and otherwise, I wish to stress the importance of training students to be self-reliant and to train themselves to verbalize how their singing and general health feels to them. This will also allow them to gage their level of comfort when trying on new concepts, to sense minute changes in their vocal apparatus, and to abstain from harmful practices before they become habits. Keeping a similar journal to the one suggested in table 4 may aid in achieving such a purpose, together with encouraging kinesthetic feedback in the voice lesson.

⁹⁷ Gates, *The Owner's Manual*, 28-29.

⁹⁸ Sundberg, *The Science*, 185.

Chapter 4: VOICE ASSESSMENT

Applied voice instruction is for the most part reactionary in nature: students arrive with their unique vocalism and personalities, and the instructor, reacting to perceptual observations, devises a plan to better the voice. As opposed to patients who present themselves with symptoms and specific complaints for the doctor to resolve, it is most often the teacher's task to detect the subtle needs of a developing voice, deciding what to address at the moment, and how to transmit the information. Teachers have the added duty of operating as a gateway to addressing potential voice disorders. A set of tools the function of which is to guide teachers in detecting potential warning signs is thus warranted in identifying problems before they prove bothersome or detrimental to students' vocal health and hinder their general vocal progress. Physical data collection relies on verifiable information, such as that observed by a doctor upon laryngoscopy, or through voice analysis software. The remainder of the data collection process relies on astutely acquired perceptual observations.

Wicklund uses a baseline data gathering process to be used by speech language pathologists and singing voice specialists.⁹⁹ The data contains both instrumental and

⁹⁹ Wicklund, *Singing Voice*, 79-91.

perceptual information regarding pitch, intensity, resonance, duration and quality. With the exception of the baseline medical assessment, the data collected here below addresses these parameters and can easily be acquired by a singing teacher without the need for expensive laboratory equipment or imaging.

BASELINE MEDICAL ASSESSMENT

In an ideal world, students would receive a thorough medical assessment and imaging by a laryngologist at the onset of studies. This would serve the purpose of detecting any vocal disorders, as well as provide baseline comparative information should there be any cause for concern during students' vocal careers. To that end, students should obtain digital copies of their baseline stroboscopy to be filed in their personal medical records. A medical professional would observe laryngeal behavior at rest, during normal conversation/reading of a passage, at high and low pitches, in whisper mode, performing glides, and perhaps also singing a passage relevant to the singer's repertoire.

It would be challenging to make such a procedure a requirement for voice students for a number of reasons, most striking of which is the fact that it is an expensive procedure in the United States that seldom is covered by medical insurance in the absence of medical necessity. Nonetheless, Wicklund confirms such a practice existing at *Western Michigan University*, where the voice department is closely associated to the university voice clinic.¹⁰⁰ McCoy and Halstead encourage a baseline "well-visit."¹⁰¹

¹⁰⁰ Ibid.

VOICE STUDIO INTAKE HISTORY

A student's voice, mode of learning, and predisposition to certain voice disorders are a sum of his or her experiences, physiognomy, habits and personality. A thorough intake history may aid the teacher in determining a pedagogic approach to the student, topics that need to be addressed, and in the event of a suspected disorder, an array of information to substantiate these suspicions. For example, if the teacher suspects a student with signs of vocal fatigue of extreme vocal tasking, and her intake history notes that she is of a very talkative predisposition and is part of the cheerleading team, a conversation on vocal load and hygiene is due without delay! A sample questionnaire is available in Table 5, on pages 59-60. Teachers may want to ask their students to bring such a questionnaire, completed, to their first voice lesson or soon after. This will help in assessing the student's background, general vocal health and voice study information, identifying potential vocal health warning signs. The author notes a need for studies judging the efficacy of such questionnaires in recognizing potentially hazardous vocal habits in college voice studios.

As the first meeting takes place, teachers should take note of the quality of the student's posture, spoken voice, its placement, the presence of vocally harmful habits such as excessive muscular tension, frequent throat clearing and so forth. Many of the items listed here are revisited in the *Perceptual Voice Assessment* worksheet in table 6, on page 61.

¹⁰¹ McCoy, *Your Voice*, 131.

INCOMING STUDENT QUESTIONNAIRE*
VOICE STUDIO OF _____

NAME: _____ TODAY'S DATE: _____
DOB: _____ AGE: _____ GENDER: _____
UNDERGRADUATE/GRADUATE? _____ YEAR OF STUDY: _____

PROGRAM OF STUDY: _____ TRANSFER? _____

VOICE TYPE: _____ IF TRANSFERRED, FROM _____
WHERE: _____
PREVIOUS SCHOOLS/DEGREES _____

CAREER GOALS: _____

YEARS OF SINGING INSTRUCTION: _____ HOW MANY YEARS HAVE YOU
STUDIED WITH YOUR
PREVIOUS TEACHER?
SINCE THE START OF YOUR VOICE STUDIES, HAVE YOU HAD EXTENDED PERIODS OF
TIME WITHOUT SINGING/VOICE LESSONS?

HAVE YOU HAD A COURSE ON VOICE SCIENCE &/OR VOICE HEALTH?

HOW WOULD YOU RATE YOUR KNOWLEDGE OF VOCAL HEALTH?

HOW WOULD YOU RATE YOUR KNOWLEDGE OF REPIRATORY AND LARYNGEAL
ANATOMY?

DO YOU, OR HAVE YOU SUNG PROFESSIONALLY (WHERE/WHAT)

- IN CHOIRS
- IN OPERAS
- OTHER:

DO YOU PLAY AN INSTRUMENT, IF YES, WHICH?

DO YOU PRACTICE ANY SPORTS, IF YES, WHICH?

WHAT HOBBIES DO YOU ENJOY?

WHO ARE YOUR VOCAL ROLE MODELS?

WHOSE VOICE DO YOU IDENTIFY WITH/ASPIRE TO SOUND LIKE?

Table 5. Intake History

Continued.

Table 5. Continued

WHICH SINGERS DO YOU LISTEN TO?

DO YOU REGULARLY ATTEND CONCERTS, BOTH VOCAL AND OTHER?

WHAT REPERTOIRE WOULD YOU LIKE TO SING:

PLEASE ATTACH AN UPDATED REPERTOIRE LIST ON WHICH YOU ALSO LIST THE FIVE LATEST SOLO VOCAL WORKS YOU HAVE BEEN WORKING ON

DO YOU ALREADY HAVE A LARYNGOLOGIST YOU CAN CONSULT IN CASE OF MEDICAL NEED?

HOW DO YOU USUALLY FEEL VOCALLY AFTER AN HOUR OF SINGING?

ON A SCALE OF 1 TO 10, HOW WOULD YOU RATE YOUR DAILY STRESS LEVELS?

TOTAL HOURS OF SINGING A WEEK:

PRACTICE:

JOB:

LEISURE:

CHORAL:

PERFORMANCE:

OTHER GROUPS:

AVERAGE WATER CONSUMPTION PER DAY:

HOW MANY CUPS OF COFFEE/SODA/CAFFEINE/ENERGY DRINKS DO YOU CONSUME ON A TYPICAL DAY?

DO YOU SMOKE?

WERE YOU A SMOKER AT ANY POINT?

DO YOU USUALLY FEEL RESTED/GET ADEQUATE AMOUNT OF SLEEP?

IS THERE ANYTHING ELSE REGARDING YOUR VOICE THAT YOU WOULD LIKE TO SHARE WITH ME?

HOW WOULD YOU DESCRIBE YOUR SOCIAL SPEAKING HABITS?

*As your voice teacher, I hereby state that all information shared in this questionnaire is to remain confidential.

PERCEPTUAL VOICE ASSESSMENT

NAME:

	1	2	3	4	5	Comments
SPEAKING						
Too High						Too low/vocal fry
Nasal						Loft
Loud						Barely audible
Supported						Unsupported
Pressed						Resonant
tongue tension						No tongue tension
jaw tension						No jaw tension
Talkative/extrovert						Introverted
Good Posture						Bad posture
Throat clearing						
Coughing						
Hoarseness						
Visible signs of tension						
SINGING						
Supported						Unsupported
Glottal onset						Breathy onset
Pressed tone						Breathy tone
High Db/pushing						Low Db/underenergized
Agile voice						Difficulty moving the voice
Difficulty with <i>pp</i>						Difficulty with <i>ff</i>
Difficulty with <i>passaggio</i>						flawless register transitions
Fast Vibrato						Slow Vibrato
Uneven Vibrato						
Difficulty with intonation						Good intonation
Difficulty with pitch						
Difficulty with <i>pp</i> at high F0						
Inability to sustain a note						
Inability to < >						
Effortful vocalizing						
Voice Breaks						
Hoarseness						
Inability to sustain a phrase						
"Scooping" onset						
Requires long warm up						
Voice tires quickly						
NOTES FROM DATA ACQUISITION:						
Vibrato rate:						
Range:						

* In the absence of comparison factors, 1 is the most, 5 is the least.

Table 6: Perceptual Voice Assessment

BASELINE VOICE ANALYSIS DATA

I suggest that voice teachers acquire basic data about each student's voice so as to notice changes throughout voice study and substantiate the reason for these changes.

While this is not standard practice and has not been demonstrated in rigorous studies, the practice is non-invasive, and the information to be derived from the data acquired is invaluable. Speech and language pathologists make use of the voice range profile to assess the evolution of a program of therapy.¹⁰²

The Singer's Voice Range Profile, otherwise known as a Phonetogram or VRP, results in a two-dimensional *voiceprint* showing the minimum and maximum amplitudes throughout singers' sung range. While protocol for acquiring such data varies greatly, the equipment needed is that of a keyboard, or pitch-acquiring device available in every voice studio, together with a sound level meter. Most voice laboratories in universities are equipped with one, and the costs associated with acquiring a relatively basic model are far from prohibitive (ranging anywhere from \$20 to \$70 and beyond as of the writing of this document). Singers would start in their middle range and work down their range on a chosen vowel to the lowest sung note by semitone, followed by ascending in pitch to the highest sung note by semitone. Each frequency should be repeated at the very lowest and highest amplitudes. Measures should be taken to keep the mouth to microphone distance at a constant for best reliability of results. This will give teachers a clear idea of a student's vocal range, together with the singer's zones of comfort, where the voice shows a large difference between loud and soft dynamics. Once a protocol and sound

¹⁰² Holmberg, "Phonetograms as a tool in the Voice Clinic," 113-127.

meter have been acquired for the initial VRP, it is imperative that the same protocol be followed meticulously for future data collection and comparison to baseline. The reasons for variations on either extremities of pitch or amplitude when comparing VRPs should be carefully considered.¹⁰³ The singer's voice range can help determine voice type.¹⁰⁴ Welham attempted to gage changes in vocal function and fatigue by studying measures of acoustic perturbation, sound pressure level, and fundamental frequency measurements throughout the singers' range.¹⁰⁵ The latter two measures deemed to be most indicative of vocal change. After a lengthy vocal task, increases in minimum attainable SPL (sound pressure level), and minimum, maximum, and habitual pitches were noted. Minimum attainable SPL was found to be "more indicative of subtle changes in phonatory control."¹⁰⁶

LeBorgne and Weinrich¹⁰⁷ examined changes in VRP measures over a nine-month training period of graduate students, finding significant changes in mean frequency range and minimum vocal intensity across frequency levels. These two studies confirm the suitability of the VRP as a tool to assess vocal function in singers.

Voice analysis software such as VoceVista may be used to determine the student's vibrato rate, notice its consistency throughout legato singing, and observe

¹⁰³ Titze, *Principles of Voice*, 259-265.

¹⁰⁴ *Ibid.*, 205-206.

¹⁰⁵ Welham, "Vocal Fatigue," 3-12.

¹⁰⁶ *Ibid.*, 9.

¹⁰⁷ LeBorgne, "Phonetogram Changes," 37.

whether a fluid legato line with consistent presence of harmonics and maintenance of the singer's formant is present. A printout of a representative portion of the analysis should be kept in the student's file for future comparison.

PERCEPTUAL VOICE ASSESSMENT

The perceptual voice assessment of a voice student can commence during simple discourse with her teacher. Voice placement, either too high or too low, use of glottal fry, frequent coughing, throat clearing, tense or hypofunctional voice production should be noted.

As touched upon in the first chapter, vocal fold swelling is a determinant of vocal fatigue. Since swelling may occur as a first response before vocal lesions occur, a system for recognizing its occurrence and addressing it before further development is warranted. As singing challenges the folds to an entire range of motions, it seems logical to implement a system to recognize swelling perceptually through the development of exercises that explore a wide range of laryngeal motions.

Testing the efficacy of simple vocal tasks to detect vocal fold swelling, Bastian et al. compared the efficacy of a legato exercise on *ppp*, that of a *pp* staccato vocal exercise, and the use of the trill as diagnostic tools for vocal fold swelling.¹⁰⁸ The first two exercises were deemed most efficient for this purpose, the results of which were confirmed by Keidar, one of the co-authors of the aforementioned article, in a book chapter published recently.¹⁰⁹ The two exercises are comprised of:

¹⁰⁸ Bastian, "Simple Vocal Tasks," 172.

¹⁰⁹ Keidar, "Self-Screening," 355-66.

- 1- Singing the first phrase of the popular nursery rhyme *Twinkle twinkle little star*, or *Happy Birthday* on a *ppp legato*. Singers are instructed to strive for a clear, vibrato free sound, with great attention to the legato line, singing the phrase in one breath.
- 2- An all-*staccato* exercise on /jo/ with *pp* dynamic on a simple five note descending major scale preceded by four *staccato* repetitions of 5-6 scale degrees (5656 5656 54321) starting in the middle register, and going up in semitones to the upper limits of their range. Rhythmic integrity (all equal eighth notes and a quarter note at the end), tempo and intonation are to remain precise. Students should be informed that voicing should start neither abruptly, as in glottal onset, nor with forced breath.

The test, explains Keidar, lies in the understanding that vocal problems are most apparent when the folds are performing in quiet dynamics and high frequencies, moreover reducing fold contact to the very outer edges of the folds. In that configuration, available to sopranos in high voice, and in male voices in *falsetto*, vocal fold swelling may be detected if the singer is unable to sing quietly. It will also be apparent should breathiness increase as frequency increases, if there seems to be a delayed phonatory onset preceded by a slight breathy stream of air, or if intermittent aphonia is present, where voicing is inaudible for even the shortest time.

While including these exercises in a perceptual assessment of voice, I also suggest the use of a few other exercises in addition. The supplementary exercises are aimed to

address a vaster majority of potential disorders resulting from swelling and irritation of the vocal folds, such as vocal fold lesions, disorder of use such as muscle tension dysphonia, as well as neurological disorders such as vocal fold paresis.

In addition to the ones proposed by Keidar, these exercises include vocalizes requiring agility and accurate intonation, such as:

- 3- fast paced *arpeggios* and eight-note ascending scales.
- 4- held notes, each on *pp* and *ff*.
- 5- *Messa di voce* exercises across the vocal range.
- 6- *Glissandi*, from the lowest to the highest note, on *pp*.

They should be performed on vowels that feel comfortable to the singer, taking care of changing vowels as needed to accommodate good voicing. The teacher should here suggest appropriate vowels to use depending on voice type/passaggio event. A forward focusing, resonant and supported sound, alleviating excess laryngeal involvement should be aimed for. Future studies judging the efficacy of detecting voice disorders through the use of these supplementary exercises are warranted.

What to listen for?

- 1) In the arpeggio and fast scale exercise: listen for clarity, good intonation and the ability of the voice to move fluidly between notes. While not all voices are meant to possess the agility of a *coloratura*, some vocal pliability is expected of all.
- 2) For the held note exercise, as well as the *messa di voce*: the inability to phonate at one dynamic or another, or to maintain a healthy, consistent vibrato might indicate vocal pathologies. Also listen for any pressed sounds or glottal onsets

that may indicate fluctuations of vibrato and accompanying excess laryngeal tension.

- 3) *Glissando* exercise: watch for pitch breaks, or sudden changes in registration.

This could be indicative of paresis, muscle tension dysphonia, or a surface vocal pathology. It could also be due to a lack of training, which is addressed in the following chapter.

As students acquire a good singing technique, teachers will need to adapt the perceptual assessment exercises to the specific ability of the student. They are for the most part quite straightforward, but for example, a high, supported and free sounding pianissimo is rarely a tone a beginning student can easily master. Yet it could be a sign of mucosal swelling. Hence the necessity to adapt perceptual voice assessment exercises to varied, easily attainable tasks so as to observe consistency of symptoms across tasks. A perceptual voice assessment guide is provided in table 6 to aid the teacher in recognizing symptoms.

STUDENT SELF-PERCEPTION RATING

Noting a lack in voice self-rating tools specifically designed for singers without specific complaints of vocal impairment or suspected disorder, Phyland et al. developed and validated the EASE questionnaire to assess singers' current perceptions of their vocal well being.¹¹⁰ It is here enclosed in table 7, page 69. The authors commenced the study with a lengthy questionnaire addressing all possible symptoms of singing voice malfunction, or indicators of a disorder, which after analysis came down to 20 questions

¹¹⁰ Phyland et al., "Development and Preliminary Validation of the EASE," 454-462.

divided into two segments: the first subset represented questions addressing physical symptoms of vocal fatigue, while the second related to mucosal changes under the effects of overuse and vocal pathology. While the authors caution that the use of the scale will only be valid once external validity is tested and confirmed, it is thought to have potential to be a useful scale in determining “potential changes in the physical aspects of vocal function across time, vocal load, and contexts.”¹¹¹ It may also aid in defining individual vocal load thresholds, rest time needed in between performances, and aid in screening singers who may be at a risk of developing voice disorders.

Armed with a medical assessment and imaging (if possible), a voice studio intake history, baseline voice analysis data, the teacher’s perceptual voice assessment, and the student’s self perception rating, we now have an array of assessment tools that will help detect whether students have symptoms of vocal fatigue, poor singing technique, or a voice disorder. Once the initial baseline assessment is gathered, teachers should repeat these periodically, and especially after *red flag* events, such as illness, long breaks, stressful periods, intense performing schedules, surgery, intubation, and after a pregnancy and delivery.

¹¹¹ Ibid., 460.

Items	Not at All	Mildly	Moderately	Extremely
Factor 1				
My voice is husky				
My voice is dry/scratchy				
My throat muscles are feeling overworked				
My voice feels good				
My top notes are breathy				
The onsets of my notes are delayed or breathy				
My voice sounds rich and resonant				
My voice is ready for performance if required				
My voice is tired				
My voice is worse than usual				
Factor 2				
My voice cracks and breaks				
My voice is breathy				
I am having difficulty with my breath for long phrases				
My voice is cutting out on some notes				
I am having difficulty changing registers				
Today I am having difficulty with my high notes				
I am having difficulty projecting my voice				
I am having difficulty singing softly				
Singing is hard work				
I am having difficulty sustaining long notes				

Reprinted from *Journal of Voice*, 27/4, Debra J. Phyland et al., "Development and Preliminary Validation of the EASE: A Tool to Measure Perceived Singing Voice Function," 454-462 (2013), with permission from Elsevier.

Table 7. EASE

Chapter 5: ADDRESSING SYMPTOMS

Armed with an understanding of the various interconnected systems of voicing, knowledge of the symptoms of voice disorders, and protocols for surveying and recognizing warning signs, our next task as voice teachers is to devise a plan for addressing symptoms that may be cause for concern.

As we set out to recognize symptoms that may be indicators of voice disorders, I wish to note that not all technical vocal faults are included in our discussion, for some do not directly point to a disorder and are therefore beyond the scope of this document. Meanwhile, some symptoms that necessitate immediate medical attention are included, for they may be encountered in the voice studio.

LEVEL OF STUDENT, INCOMING OR CONTINUING

In dealing with the student population, Wicklund notes the following challenges:

- “- Differences in students’ baseline knowledge of the voice
- Participation in multiple Styles of Singing
- Singing in non-optimal voice ranges/tessiture
- Over-singing/out-singing in choral setting.
- Unhealthy vocal health practice.
- Inappropriate use of the speaking voice.”¹¹²

¹¹² Wicklund, *Singing Voice*, 139.

Teachers should take note of these factors when meeting incoming students. There are indeed challenges in working with new students as opposed to ones teachers have been working with or known for some time.

Establishing a baseline assessment tool points to symptoms heard at that very moment. Assessing whether a specific symptom is caused by habitual misuse, unhealthy vocal health practices, or has had a gradual or sudden onset is left to the self-reporting of the student together with the teacher's best judgment. As we shall see in our later discussion, sudden onset of some symptoms may warrant immediate medical attention.

With continuing students, teachers have the benefit of a baseline assessment that can be compared to newly developing symptoms. They may perform periodic assessments, note gradual changes, and quickly recognize a sudden onset. As longevity in voice studies with the same voice instructor accrues, trigger situations such as stressful performances or exams, long vacations, summer vocal programs and so forth may highlight patterns of voice use to address.

On a final note regarding beginning students: Some yet technically lagging students may find it difficult to seamlessly accomplish the vocal exercises mentioned for diagnosis. I urge teachers to find ways of tailoring an otherwise difficult exercise to the specific ability of the student. For example, if attempting a high-pitched *ppp*, it could be helpful to take the exercise out of context, and ask the student to imitate a cat, or sing a soft lullaby to a baby, etc.

MCKINNEY MODEL OF DIAGNOSIS

In *Diagnosing Vocal Faults*, McKinney points to the tried and true model of diagnosis for voice teachers:

- 1) What is wrong with the sound I am hearing?
- 2) What is causing it to sound that way?
- 3) What am I going to do about it?¹¹³

As we had delved into the first item of diagnosis in earlier chapters, we will next determine how to best use the assessment tools explored in chapter 4. We will then turn our attention to determining a way to classify symptoms of concern and a plan of action for addressing them in the voice studio.

ASSESSMENTS: BASELINE, INTAKE HISTORY, EASE

While the list of symptoms that might raise concern is smaller than the multitude of information gathered in these assessments, they are useful in offering the teacher as much background information as possible to address the problem in the studio. For example, while poor posture is by no mean indicative of a voice disorder, it can have a rather negative effect on vocal technique resulting in sub-optimal respiration,¹¹⁴ which may give rise to a slew of more worrisome symptoms. Bad intonation when attempting higher dynamics may explain laryngeal strain, as it could point to a habit of increasing sub-glottal pressure without a corresponding rise in glottal adductory tension.¹¹⁵ This information may also offer background information to substantiate a concern or pinpoint

¹¹³ Ibid.

¹¹⁴ McCoy, *Your Voice*, 114.

¹¹⁵ McCoy, *Your Voice*, 114.

a problem that is best addressed in clinic. An example of this would be a student who presents with a slight change in timbre, together with a loss of range. Suspecting vocal fatigue, we might suppose she would need to review voice hygiene measures, examine her vocal load, and/or work on resonance & registration events and vowel modifications. If on reviewing notes on her perceptual assessment, the teacher observes frequent throat clearing, a possible culprit could be a symptom of GERD. An expedient visit to the laryngologist is then warranted. Another student shows breathiness at the higher end of her range, and an inability to sing at decreased amplitudes. If, in her perceptual assessment, the teacher noted her being quite talkative, speaking loudly at low pitches, and her personal voice use journal vouched for long periods of vocalization, her habits might raise concern for a vocal fold lesion, perhaps a nodule. The teacher should then advise the student to consult a laryngologist.

WHEN TO GO TO THE LARYNGOLOGIST'S

Wicklund notes reasons for immediate concerns for dysphonic sounds to be:

- “- Breathiness/huskiness in a pitch range where it was not present before, indicating possible vocal mass swelling.
- Phonation with more than one pitch, indicating a possible hemorrhage, ectasia, or ventricular phonation.
- Pitch/phonation breaks and/or range loss where they were not present before, indicating any number of etiologies.”¹¹⁶

Wicklund further states that experiencing hoarseness or other problem for more than two weeks warrants medical attention.¹¹⁷

¹¹⁶ Wicklund, *Singing Voice*, 37.

¹¹⁷ Ibid.

In addressing laryngitis problems, McCoy and Halstead warn:

“If your voice doesn’t feel or sound right and you may have any suspicion that you might be ill or injured, KEEP QUIET! If rest and hydration do not resolve the problem after a week, consider seeking attention from a laryngologist. If the laryngitis is the result of voice abuse or misuse, the abusive behavior must be stopped or you will risk serious injury and long term voice impairment.”¹¹⁸

The authors specify laryngitis to be any sort of laryngeal inflammation, whether caused by environmental or behavioral irritants or infectious diseases.¹¹⁹ I think it a good maxim to keep for any sort of vocal problem where something just doesn’t feel right to the singer. Students should be encouraged to stop, re-evaluate, and discuss their doubts with their teacher. They could just be uncomfortable introducing a new concept, just as they may be applying it in an incorrect fashion, or facing laryngeal resistance, fatigue, or a potential voice disorder. Having a studio atmosphere where students may share these doubts or discomfort is conducive to improving technically, and preventing a slew of unhealthy vocal mannerisms before they become new habits to address.

Gates et al. prefers to take a more reactive approach to symptoms of laryngeal edema. We shall remember that its symptoms are hoarseness, a deep throaty voice, and loss of flexibility and range.¹²⁰ These may also present as acute laryngeal fatigue, and may have a number of causes. If the symptoms persist for more than 24 hours, or if students feel doubtful of their condition, they are encouraged to seek medical help.

¹¹⁸ McCoy, *Your Voice*, 133.

¹¹⁹ Ibid.

¹²⁰ Gates, *The Owner’s Manual*, 116.

Laryngeal pain warrants immediate medical attention, and vocal rest until then. Though rare and caused by prior surgical intervention, it may indicate dislocated arytenoids, which can be quite painful and cause long term damage if not addressed promptly. It may also be a symptom of arthritis, laryngitis, laryngeal granuloma, contact ulcers, or muscle tension dysphonia.¹²¹

CLASSIFYING SYMPTOMS

In attempting to address symptoms in an easily recognizable manner, it seems efficient to group them into logical categories that might make for a more efficient way of addressing them. I therefore searched for ways to group these symptoms.

As in McKinney's approach to divide phonation and respiration into hyperfunctional and hypofunctional categories, we could go about dividing symptoms as pertaining to such appellations depending on the hyper- or hypo- mechanism they originate from. But problems arise when the same symptoms may be caused by differing mechanisms, especially when trying to differentiate between a technical issue and a voice disorder. A vocal fold paresis, for example, could manifest itself by effortful singing as the mechanism attempts to compensate for the less functional vocal fold. While the etiology is that of a hypofunctional vocal fold, the symptom may manifest itself as hyperfunctional phonation.

We can next attempt to classify according to the system it concerns, that of respiration, phonation, or resonance, for example. Only most audible clues relate to the

¹²¹ Ibid., 56.

source of sound, and therefore phonation, even when the problem lies within another system, or is an issue of coordination, as we shall later see it is, in most cases.

It seems prudent for now to abstain from categorizing voice symptoms, but find a way to logically address them. As we have already identified the symptoms of potential concern from the literature about voice disorders, we shall next attempt to address them from a technical standpoint, and point to instances where medical attention by a laryngologist may be warranted. The nature and severity of the symptom will dictate the necessity to refer a student to seek immediate medical attention.

A special note should be made to check simultaneously occurring symptoms, and substantiate any doubts in voice technique or disorder concerns from background information gathered about the singer during assessments.

It is beyond the scope of this document to recommend specific exercises to address vocal issues for each instance. There are many excellent voice pedagogy articles and books that address this issue in full length, such as McKinney's *The Diagnosis and Correction of Vocal Faults*¹²² and Miller's *The Structure of Singing*.¹²³

Finally, when addressing symptoms, I urge teachers to be mindful of choosing what to approach in a methodical fashion, so as not to counter-productively overwhelm the student with a multitude of concepts.

¹²² McKinney, *Diagnosis and Correction*.

¹²³ Miller, *The Structure of Singing*.

ADDRESSING SYMPTOMS

Breathy singing. McCoy,¹²⁴ McKinney,¹²⁵ Titze,¹²⁶ and Wicklund¹²⁷ agree that a breathy tone is resultant from improper closure of the glottis, made worse by poor breath support. The folds must therefore be trained to adduct properly, adjusting subglottal pressure to serve optimum vocal fold movement. In Titze's words: singers must "adjust the average glottal flow resistance for a combination of maximum aerodynamic to acoustic energy conversion and minimum disturbance of the natural vibratory patterns of the vocal folds."¹²⁸

Wicklund warns of differentiating between normal-voiced breathiness caused by technical problems or by a developmental glottal chink from more serious dysphonia. The author notes that normal voice breathiness should improve with vocal exercises that emphasize vocal focus throughout singers' range. This can take a while to accomplish, and requires both patience, and assurance of follow-through from the student. Teachers should watch for forced breathiness as in that occurring with excess laryngeal tension, and simultaneous hoarseness for it could be an indicator of pathology.¹²⁹

¹²⁴ McCoy, *Your Voice*, 113.

¹²⁵ McKinney, *Diagnosis and Correction*, 82.

¹²⁶ Titze, *Principles of Voice*, 84.

¹²⁷ Wicklund, *Singing Voice*, 38.

¹²⁸ Titze, *Principles of Voice*, 84.

¹²⁹ Wicklund, *Singing Voice*, 38.

Teachers may wish to apply the concepts of Resonant Voice such as sensations of forward resonance, the use of humming exercises that eventually develop into a voiced vowel, and following through with that concept, nasal consonant-vowel combinations. Students may also be instructed to sing out, sing louder, as breathiness is often accompanied by low amplitude, do gentle lifting exercises to encourage muscle tonus and approximation of the vocal folds, and inquire as to students' vocal role models.¹³⁰

As previously mentioned but bears repeating, if symptoms persist and do not answer to the above exercises, or are accompanied by hoarseness or laryngeal tension, students should be encouraged to seek out a consult with a laryngologist. Wicklund advises for singers to seek immediate medical advice if breathiness and hoarseness occur simultaneously and suddenly. A breathy tone could be indicative of vocal fold swelling,¹³¹ vocal fold bowing,¹³² vocal fold paresis or paralysis,¹³³ and when accompanied by hoarseness, Laryngeal Papilloma.¹³⁴

Breathy Onset. A breathy tone is often preceded by a breathy onset. Adequate glottal closure with corresponding subglottal pressure should be taught to aim for a balanced onset. This can be achieved by using exercises that begin with consonants such

¹³⁰ McKinney, *Diagnosis and Correction*, 83-84.

¹³¹ Keidar, "Self-Screening for Vocal Injuries," 355-66.

¹³² Gates, *The Owner's Manual*, 133.

¹³³ McCoy, *Your Voice*, 138.

¹³⁴ Gates, *The Owner's Manual*, 144.

as /g/, eventually encouraging the use of a “silent” glottal¹³⁵. The exercises used above for breathy tone are also relevant. McCoy warns of habitual breathy onsets being precursors to chronic incomplete closure or MTD¹³⁶, with newly appearing delays in onset as potential indicators of vocal fold nodules¹³⁷.

Frequent breaths. A breathy tone, or an inefficient management of breath may lead singers to require the use of shorter phrases to facilitate frequent breaths¹³⁸. Titze also warns of fatigue of laryngeal muscles, as well as fatigue of the respiratory muscles that are responsible for maintaining sub-glottal pressure, mainly the abdominal and intercostal muscles¹³⁹. Vocal fatigue that lasts longer than two weeks, especially if frequent breaths are accompanied by other symptoms, warrants medical attention. Nonetheless, the symptom of frequent breaths in and of itself may answer to addressing problems in posture affecting respiratory fatigue, laryngeal tension affecting fatigue of laryngeal muscles, and improper management of breath during respiration and phonation.

Low Volume/Weak Voice. When accompanied by breathy singing, see the section on breathy tone. If addressing the former doesn't resolve the problem, or if the

¹³⁵ McCoy, *Your Voice*, 113.

¹³⁶ Ibid.

¹³⁷ McCoy, *Your Voice*, 136.

¹³⁸ McKinney, *Diagnosis and Correction*, 83-84.

¹³⁹ Titze, *Principles of Voice*. 361-363

onset is sudden, a pathology such as vocal fold bowing,¹⁴⁰ or other neurological impairment¹⁴¹ may be the underlying cause. See laryngologist.

Difficulty adducting/onset. The problem here could lie in vocal fatigue, making the phonatory threshold pressure required for phonation hard to acquire, similarly to the concept of breathy onset. A difficult onset is most often a result of vocal fatigue and may be a manifestation of edema or laryngeal sicca,¹⁴² or of a neurological impairment.¹⁴³ If the problem persists after rest, re-occurs when vocal activity re-commences, is sudden, or is accompanied by other vocal fatigue symptoms, see laryngologist.

Glottal onset. An excessive glottal onset is caused by strong laryngeal tension accompanied by an increase in breath pressure. The vocal folds are forced apart, resulting in an explosion of tone. It can be remedied by encouraging a more balanced onset through soft attacks, a reduction in laryngeal tension and/or postural rigidity, yawns, easy phonation¹⁴⁴. McCoy warns of repeated glottal onsets leading to the formation of nodules¹⁴⁵. McKinney mentions the symptom of glottal onset may be indicative of

¹⁴⁰ Gates, *The Owner's Manual*, 135-136.

¹⁴¹ Titze, *Principles of Voice*, 272-275.

¹⁴² Gates, *The Owner's Manual*, 154-155.

¹⁴³ Titze, *Principles of Voice*, 357-359.

¹⁴⁴ McKinney, *Diagnosis and Correction*, 90.

¹⁴⁵ McCoy, *Your Voice*, 113.

nodules, polyps, or contact ulcers¹⁴⁶ as singers attempt to increase vocal fold closure that is impeded by a vocal fold lesion.

Pressed Voice. The opposite of the spectrum from breathy voice, it is the result of laryngeal tension coupled with subglottal forces. It can be accompanied by variations in resonance, lack of vibrato or vibrato irregularity, rigid posture, a “tanking up” of breath, rigidity in the laryngeal mechanism, excessive tension, and loss of range. Singers should coordinate their laryngeal response to the exiting breath so as to accomplish a balanced voice. Similarly to the glottal onset, and often following one, “the intrinsic muscles of the larynx are attempting to resist a high level of subglottic pressure driven over resisting vocal folds.”¹⁴⁷ Titze suggests remedying pressed phonation with encouraging sensations of ease of airflow, the use of the sigh, or onset with a silent /h/.¹⁴⁸ A result of hyperadductive phonation, pressed voice may lead to vocal fatigue, nodules, and be indicative of muscle tension dysphonia¹⁴⁹ and contact ulcers.¹⁵⁰ If symptoms persist and do not answer to corrective procedures for vocal technique, recommend a consultation with a laryngologist.

Hoarseness. An indication of hoarseness is immediately source of concern. Titze suggests seeking medical advices if it persists for more than two weeks. Wicklund

¹⁴⁶ McKinney, *Diagnosis and Correction*, 90.

¹⁴⁷ Miller, *The Structure of Singing*, 60.

¹⁴⁸ Titze, *Principles of Voice*, 116-117.

¹⁴⁹ Gates, *The Owner's Manual*, 146.

¹⁵⁰ Titze, *Principles of Voice*, 351.

advises immediate medical attention if it occurs with breathiness in a pitch range where it wasn't previously present.¹⁵¹ When it is gradual, it may be caused by a vocal fold varix.¹⁵² Intermittent hoarseness may be an indication of reflux and heartburn.¹⁵³ Hoarseness may be a sign of swelling/edema, a polyp,¹⁵⁴ arytenoid dislocation, vocal fatigue, Keratosis, Cancer,¹⁵⁵ Papilloma, etc.

Raspiness. Slightly distinguishable from hoarseness, raspiness might come from the involvement of the false vocal folds, or improper speech habits. If it doesn't respond to forward/resonant voice exercise applications for the singing voice, see a laryngologist. Gradual raspiness/hoarseness may be indicative of a vocal fold varix, cyst, or papilloma.¹⁵⁶

Deep, throaty voice. Question vocal models, self-perception of voice, attempt to alleviate articulatory and external laryngeal tension, and notice any improvements in the voice. If there is no improvement, see a laryngologist, it could be a sign of Edema.¹⁵⁷

Difficulty warming up. Check warming up protocol if the complaint comes from unsupervised practice time. If it is associated with pain, illness, or menstruation, vocal

¹⁵¹ Wicklund, *Singing Voice*, 37.

¹⁵² Gates, *The Owner's Manual*, 120-121.

¹⁵³ Ibid., 67-69.

¹⁵⁴ Ibid., 115-128.

¹⁵⁵ Titze, *Principles of Voice*, 355.

¹⁵⁶ Gates, *The Owner's Manual*, 120-144.

¹⁵⁷ Ibid., 114-116.

fold swelling might be the culprit.¹⁵⁸ Abstaining from phonation, or singing vocally less-demanding repertoire on those days might be advisable. Review vocal hygiene measures with student. It could be a side effect of edema resulting from arthritis, hyperfunction voice disorders, irritating lesions, menstruation or GERD.¹⁵⁹

Effortful phonation, voice fatigues easily. “If a singer fatigues after moderate high-range exposure, acoustic and physiologic factors may be in conflict.”¹⁶⁰ Check vocal positioning, posture, resonance issues, laryngeal tension. Effortful phonation and fatigue may be indicative of nodules, cysts, vocal fold bowing, paresis/paralysis, or indicative of inflammation. Voice rest is suggested, together with a consult at the laryngologists’ if symptoms persist.¹⁶¹

Diplophonia is defined as the sounding of two pitches simultaneously. See a laryngologist. Wicklund suggests immediate medical consultation, as it may stem from ecstasia, or ventricular phonation. It could also be indicative of a cyst, nodules, a polyp, Granuloma, or extreme MTD.¹⁶² In the case of a vocal fold lesion, the diplophonia results from the vocal folds being divided into two vibrating pairs.

¹⁵⁸ Ibid., 61-62.

¹⁵⁹ Ibid., 67-70.

¹⁶⁰ Miller, *The Structure of Singing*, 139.

¹⁶¹ Gates, *The Owner’s Manual*, 56.

¹⁶² Ibid., 44-45.

Acute Dysphonia or Aphonia- If symptoms persist for more than two weeks, see Laryngologist.¹⁶³ In the case of aphonia, I would recommend seeking medical care as soon as possible.

Change in timbre primarily a technical issue. Watch for nasality, tensions in tongue, jaw, and extrinsic musculature of the larynx, laryngeal height manipulation. This could be a result of changes in registration bringing about lack of control (see the section on registration in chapter two). Titze advocates the use of head voice to solve these problems.¹⁶⁴

Loss of intensity on extremes of range may be a result of singing in the wrong tessitura, wrong repertoire, not exploring one's whole range during warm-up, discomfort with middle range¹⁶⁵. May also be caused by loss of subglottal pressure/laryngeal control, not adapting resonance to pitches. McKinney warns that loss of range after brief periods of singing may be indicative of too much laryngeal tension. This could also be a result of vocal fatigue,¹⁶⁶ paresis or GERD,¹⁶⁷ vocal fold bowing, nodules edema, varix.¹⁶⁸

Small Range. While a reduced range compared to baseline data is source of concern (see above), Titze warns of the possibility of a congenitally acquired limited

¹⁶³ Ibid., 117.

¹⁶⁴ Titze, *Principles of Voice*, 301.

¹⁶⁵ Miller, *The Structure of Singing*, 139.

¹⁶⁶ Titze, *Principles of Voice*, 361-363.

¹⁶⁷ McCoy, *Your Voice*, 133-138.

¹⁶⁸ Gates, *The Owner's Manual*, 114-133.

pitch range. If singers are unable to expand their upper register, he explains it might be caused by a narrow cricothyroid space, where there is little freedom to rotate the cricoid cartilage towards the thyroid cartilage to stretch the vocal folds¹⁶⁹. While there are strategies to increase the range with use of thyroarytenoid contraction, or attempting to pull on the thyroid cartilage to extend the fold, I find such strategies to ultimately be counter-indicated for a vocal career because of the eventual likelihood of accompanying vocal issues. McCoy addresses the possibility of an elevated larynx, caused by over-activity of extrinsic musculature such as those used for swallowing, a tight, over-extended jaw, or tension in shoulders¹⁷⁰. If limited range problems exist in the primo passaggio for men, McCoy also mentions that higher portions are unlikely to ever function at their best. This may be addressed by finding strategies to stabilize the larynx.¹⁷¹

Pitch breaks. Largely a result of registration events involving source/resonance strategies. See previous explanation on resonance in chapter two. Titze suggests it is similar to singing in a tube: the resonator needs to change shape, or modify the vowel, to accommodate the new frequency.¹⁷² Regarding source factors, McKinney suggests

¹⁶⁹ Titze, *Principles of Voice*, 238.

¹⁷⁰ McCoy, *Your Voice*, 117-120.

¹⁷¹ Ibid, 151.

¹⁷² Titze, *Principles of Voice*, 113.

changes in length, tension and mass of the vocal folds to accommodate the changing needs of ascending pitches/registers.¹⁷³

Pitch breaks are of immediate concern if they weren't occurring previously. In this case, see a laryngologist. They could be indicative of vocal fold nodules, paresis, or edema. A simple glide from lowest to highest pitch on soft dynamics may aid in quick diagnosis of pitch breaks that result from vocal fold pathology.

Vibrato. A regular, healthy vibrato is naturally occurring. Vibrato variations range from a large vibrato, or wobble, no vibrato, otherwise known as a bleat, or an uneven vibrato. Miller, McKinney and McCoy concur that variations in vibrato are caused by changes in vocal freedom and energy.

According to McCoy, a wobble may be a result of poor vocal technique. Fixing it may involve addressing vocal hygiene and tonus through pulmonary fitness. An inhibited larynx, a squeezed glottis, causes a lack of vibrato, a high closed quotient, or decreased airflow. An uneven vibrato may be noticed in an inexperienced singer with a yet insecure vocal technique.¹⁷⁴

McKinney suggests checking hyperfunctional phonation/laryngeal tension: is the voice classification too high? Is the singer singing too loudly? Is the breath support locked? Is the posture tense/rigid? Are articulatory muscle hyperfunctional? Does the student have wrong vocal models? Is there tension from personality problems?¹⁷⁵

¹⁷³ McKinney, *The Diagnosis and Correction of Vocal Faults*, 1994: 97.

¹⁷⁴ McCoy, *Your Voice*, 136.

¹⁷⁵ McKinney, *The Diagnosis and Correction of Vocal Faults*, 1994: 89.

Titze lists vibrato issues as being caused by vocal fatigue, and vocal tremor to be a neurological factor, most often noticeable in the rest of the body in the older population. I believe it is advisable to see a laryngologist if symptoms persist in spite of addressing laryngeal tension issues.

Inability to sustain notes. If it is a beginner student, it could be the result of a lack of confidence in producing a balanced tone. If it is a sudden onset, it is otherwise explained in medical diagnoses such as vocal fold paresis/paralysis and newly appearing nodules, and is best referred to a laryngologist as soon as possible.

Inability to sing staccato may be caused by a lack of vocal training, or in a newly appearing or unresolved symptom, by a vocal pathology from fatigue/nodules.¹⁷⁶ See laryngologist.

Loss of flexibility may be caused by a lack of vocal training, or in a newly appearing or unresolved symptom, could be a result of sicca, nodules, edema, or vocal fold varix (Gates). See laryngologist.

CONCLUSION

Teachers may sometimes find themselves going through this cycle of assessing, detecting symptoms, devising ways of addressing them, and when warranted, referring students to the care of a laryngologist. If there is no structural problem and diagnosis by a physician, and vocal instruction doesn't improve the symptom, I urge teachers to examine their own teaching style and perhaps consult with a mentor. If the student feels comfortable with a third party observing a voice lesson, input from a trusted colleague

¹⁷⁶ Bastian, "Simple Vocal Tasks," 172-183.

can be beneficial. A consult with the student and the student's advisor may be beneficial. When all else fails, I have personally witnessed teachers suggesting a change in instructor for the benefit of the student. Far from being an injury to the ego of a teacher, it may be the simple fact that a student's personality might be better suited to another teacher. Encouraging such exchanges within voice departments may be for the benefit of both students and teachers.

I hope that this document will help pave the way for providing voice teachers with preventative measures in detecting and addressing voice symptoms that may be indicative of voice disorders. While amassing as much current information as is available at the time of this writing, there are often new findings in the field of vocal pedagogy, voice health, and research. We as teachers should stay abreast of these developments so as to be better informed regarding the vocal well being of our students. Continued dialogue with colleagues and involvement in voice conferences, together with an open exchange between the various professions that are concerned with the voice, will aid in providing voice teachers with an environment that will be conducive to the betterment of our teaching.

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