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ABSTRACT

This document examines vocal health and pedagogy as they relate to the adolescent singing voice in the 21st century, and based on the understanding gained, it develops strategies to prevent vocal injuries in adolescence, carrying good vocal hygiene into adulthood. Music educators working with adolescent singing voices can use this document as a guide to lead their students to adopt healthy vocal habits and come to an awareness of their instrument, helping to prevent vocal injury.

The author begins by reviewing literature on the topics of vocal health, hygiene and pedagogy concerning both adult and adolescent singers, and focuses on literature specifically relating to the adolescent singing voice. A healthy voice stems largely from sensible and hygienic vocal habits. The cultivation of good vocal habits seems to be more difficult to achieve as our world becomes louder and busier. Adolescence is the time when most vocal habits form establishing into a unique voice. Thus, music educators working with adolescents must seize the opportunity to replace unhealthy vocal habits with healthy ones in these young singers. The review of literature illuminates the importance of not just vocal health in young singers but also respiratory health, hearing health and health of other kinds. Since a singer’s body is his or her instrument, the whole body, not simply the larynx, must be healthy. With regard to adolescent vocal pedagogy, even after decades the works of John Cooksey, Lynne
Gackle and Kenneth Phillips remain staples of the field. Others, including Robert Edwin, have contributed significantly to current understanding of demands on today’s adolescent singer.

No singer wants to suffer a vocal injury, but it is sometimes a reality, even for young, resilient voices. Common adolescent vocal injuries, pathologies and their causes are discussed in this document as well. The author provides prevention strategies for music educators to help guard the 21st century adolescent voice against injury and includes steps to take if vocal injury is suspected.

Music educators are urged to provide a consistent technique when working with adolescents, and the document describes specific technical goals that should be achievable with every adolescent singer. An understanding of the changing physiology of adolescent singers is paramount for anyone working with them. Accordingly, the author gives an overview of vocal physiology and function, as well as interactive tools music educators can use with their students to gain better understanding of the vocal instrument. Choosing repertoire can be a conundrum when working with the adolescent voice. The author concludes with suggestions of repertoire from various genres and for different stages of adolescent vocal development.
This document is dedicated to my ever-supportive and patient husband, Brandt.
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CHAPTER 1:
INTRODUCTION

Adolescence is a time of much change within an individual. It is a time of physical change. Hormonal changes and puberty elicit physical mutations.\(^1\) Other changes that occur during adolescence are mental, social and emotional. The brain during adolescence has a special gift for recording memories and sensations to be recollected decades later, known as “The Reminiscence Bump.”\(^2\) This phenomenon appears to exist not because the brain’s memory formation capabilities themselves are greater in adolescence but rather because everyday experiences in that period of life result in a heightened emotional response, thereby creating a more vivid imprint in one’s memory.\(^3\) Thus, because experiences in adolescence are much more vivid than experiences from other life stages, it is one of the best stages, if not the very best, in which to intervene in harmful behaviors. Intervention in the adolescent singer’s harmful vocal behaviors is the focus of this document.

Through my observations of young singers as well as through teaching young singers for the past ten years, it has become clear to me that adolescence is an


\(^{3}\) Ibid, 19.
extremely opportune time for the implementation of good vocal hygiene practices for the singing voice. Unfortunately, the need for intervention in this regard is ever growing.

Pop culture could be a negative factor in the health of the 21st century adolescent voice. Any style of singing can be accomplished healthily, but the singers and musicians to whom adolescent singers are exposed grow more influential in their development as vocalists. More unfortunately, healthy vocal models are becoming yet fewer and farther between. More and more children and adolescents watch shows with poor vocal models; like *American Idol, The Voice, America’s Got Talent* and *Glee*; and aspire to become the next Jackie Evancho, Selina Gomez, or One Direction member. These shows and stars tempt young singers to push the boundaries of their own physical capabilities to sound like those they admire. Most, however, lack the technical tools, physical development and emotional maturity needed to meet the demands of the repertoire they wish to sing and the vocal challenges they often face.

In addition, parents, and even teachers, of gifted child singers tend to rush down a path of exploiting them, rather than protecting their talent, building their technique and letting their voices blossom more organically. I witnessed firsthand the negative effects of this tendency while teaching a 9-year-old girl several years ago. She was extremely talented and able to make adult-like sounds from a pre-pubescent larynx. During my four months teaching her, I attempted to direct her toward repertoire suitable for her age and to instill healthy vocal habits in her pop singing. Challenges came, though, when my student was invited to sing in a high-profile community show.
The solo she and her mother wanted me to help her prepare was “The Climb,” sung by Miley Cyrus. Though the piece was textually appropriate for a child her age, its technical demands were outside the limits of what she could healthily achieve. Nevertheless, her mother insisted on her singing the piece, and I foolishly acquiesced. After one of the dress rehearsals, her mother called and told me her daughter was distraught and crying after singing her song. My student was upset not because she sang the piece poorly but rather because the people at the rehearsal started screaming after she finished. Only later did she understand that they were screaming out of excitement and praise. Because of that traumatic experience, however, she decided she did not want to sing in public anymore. Had her mother and I cooperated in order to understand better the 9-year-old’s emotional limits, she might still be making music and be embracing her talents now as a 15-year-old.

In this example, the physical and emotional health of the child and her voice were interconnected and were adversely affected by the following: the poor vocal model chosen, the parent’s lack of education about proper repertoire for her child, the emotional immaturity of the child (including low resilience to stress and comprehension of audience enthusiasm), and the teacher’s lack of insistence on appropriate repertoire.

IDENTIFYING THE PROBLEM

Many factors can threaten the vocal health of adolescent singers besides exposure to poor vocal models. Vocal models for adolescents include pop culture icons
and other artists in the public spotlight as well as other singers and music educators who have direct contact, and thus influence with the adolescent. An example of a healthy vocal model for an adolescent is more of a conceptual ideal than a particular person, since most of the vocal models accessible to adolescents are adults and thus do not represent a physical likeness to the adolescent singer. The ideal healthy vocal model for an adolescent voice is one who uses mixed registration (e.g. head, mixed, and chest registers) and refrains from excessive belt technique. The ideal model also would sing text appropriate for adolescents as well as sing in a range of an octave to an octave and a half, and would refrain from extended phrases.

Other social, environmental, emotional, and developmental factors give rise to a host of concerns in the 21st century adolescent voice. Adolescents are subjected to some of the most diverse and emotionally complex expectations as compared to other age groups. Many are not only students but also employees, athletes and participants in a wide range of other extracurricular activities. Adolescent singers take part in work, sports and volunteer activities and others in addition to their chosen singing pursuits. Their singing activities could include school choir, community choir, church choir, community theater, voice lessons, a cappella group, praise worship, gospel singing, and so on.

When faced with these demands, adolescents generally do their best to rise to the occasion. Yet their bodies, though resilient, cannot endure all demands, especially when repeated over long periods of time. Perhaps unsurprisingly, children and
adolescents are not immune to vocal pathologies. Most of these pathologies, however, can be prevented through educating parents, teachers, choir directors, and others about healthy vocal hygiene and proper technique for the developing voice as well as appropriate repertoire for this demographic. This document is directed primarily to music educators, including voice teachers and choir directors, and secondarily to the adolescent singers themselves, their parents and beyond.

NEED FOR RESEARCH

Though vocal health and hygiene are topics that greatly impact all singers, they are under-addressed with respect to adolescents. For the developed voice, there may be a small chapter in a pedagogic text or articles in periodicals; yet there are few texts or publications that focus solely on vocal health and hygiene. There are even fewer that emphasize the adolescent voice written with an objective of vocal disorder prevention. Music educators (i.e., voice teachers, choir directors, and so on) need a resource that is relevant to adolescent voices and provides tools and suggestions which they can directly implement into their teaching. This research is a means to fill that need.

SCOPE OF RESEARCH

The aims of this document are to address the current state of research regarding the health and pedagogy of the adolescent singing voice and to identify vocal dangers today’s adolescents face. Music educators can use this document or parts thereof to
help guide their students to healthier vocal choices, habits, hygiene, repertoire and technique. It provides resources which music educators can easily extract and implement immediately with their students. It also provides a systematic procedure for building vocal technique in the adolescent voice and 21st century repertoire choices and resources for educators and singers.

The document begins with reviews of literature in the areas of vocal health and hygiene in chapter two. Chapter three reviews some of the current and most respected pedagogical techniques for teaching voice to adolescents. Chapter four discusses specific types of vocal pathologies and those for which adolescents are particularly prone. Prevention on the part of the music educator and the singer is found in chapter five and it also elaborates on the roles and purpose of the Voice Care Team. Chapter six focuses on suggestions for music educators in regard to teaching vocal technique and it stresses the importance of physiology awareness. The document concludes with solo recommendations for the mutating adolescent voice using the stage models of John Cooksey and Lynne Gackle.

**ADOLESCENT VOCAL DEVELOPMENT**

As the child and adolescent body changes, so too does the larynx and other relevant tissues, which continue to develop into adulthood. Some of the biggest physical differences between a child’s larynx and an adult’s larynx are the size, the hardening of cartilages making it more fixed and less pliable, as well as the formation of protective
three-layered structure of the vocal ligament. The vocal ligament helps protect the vocal folds from over-stretching and acts as an anchor to the vocal folds. Not until approximately age fifteen, however, do the three layers of the vocal fold become distinct. Without the developed ligament, overuse of the voice bears a higher likelihood of vocal injury, surface reactions, or both. When training the singing voice still in development, particular attention should be paid to its vulnerability: “Children have constantly changing voices with delicate muscles and fragile mucosa.... So long as one remembers that children are children, and treats their voices within limits imposed by their bodies and minds, safe, educated singing should be possible at almost any age.” This is not to say that young people should not sing; rather, they should sing with appropriate technique in suitable repertoire.

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5 Ibid.
6 Ibid.
8 Ibid.
CHAPTER 2:
REVIEW OF LITERATURE: VOCAL HEALTH & HYGIENE

INTRODUCTION

When one engages in any physical activity, the entire body is involved. Contrary to what some may believe, vocal health and hygiene involve keeping not only the vocal folds healthy but also other organs and systems of the body as well. In addition to the vocal folds, other mechanisms centrally involved in singing are the respiratory system, auditory structures, and muscles throughout the body.

Though adolescence may be a time when compliance with vocal hygiene practices is a struggle, no more important period of vocal injury prevention exists. It is posited that the adolescent brain gains heightened sensitivity to events because of the increased release of dopamine during adolescence, a chemical released in tandem with strong emotions. Because ordinary events trigger strong emotions in adolescents, the events become more engrained in their memory.

Unfortunately, keeping these young people out of vocal danger requires consistent vocal hygiene, awareness and cooperation. All of these requisites tend to be difficult for this population, due to factors including a lack of compliance and lack of education. Persistence, education and support from the influential people in their lives,

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however, can help prevent dysphonia in these singers. If it takes a village to raise a child, it takes a voice care team and others to safeguard that child’s vocal health into adulthood. In most cases, the voice care team consists of the singer’s immediate support network (e.g. parents, teachers, coaches, etc.). If a vocal injury presents or vocal misuse is suspected, the voice care team can include a laryngologist, speech-hearing pathologist and others. The voice care team will be described later.

While many advocates of vocal health and hygiene exist, few focus on the more complex subject of young voices and young singers. In this chapter, I will focus on vocal health and hygiene, and I will also provide a survey of the existing resources focusing on the young voice.

VOCAL HEALTH & HYGIENE

Music education plays a pivotal role with regard to vocal health and hygiene, in that educating young singers about the development, function, and limitations of the voice is the first line of defense against vocal injury and preventable pathologies. Focusing on the influence of music educators, Morton Cooper, a voice therapist known for his expertise in voice training, encourages music educators to be good vocal role models for young singers and to teach them how their voices work. He writes:

Children, who invariably receive no voice training, tend to yell and scream. When their voices go hoarse from this misuse and abuse, they just love to continue yelling and screaming even if they can no longer produce sound. Use good judgement if your children are prone to such excesses. Educate the gradually in the correct use of their voices. Without such guidance children are susceptible to
nodes, and other growths on the vocal cords which might require surgical excision. They are particularly vulnerable to developing negative habits, unless otherwise instructed. Give them an advantage that you didn’t have: A positive voice model and an education in the use of their voices.¹⁰

Vocal music teacher to young voices and author, Kenneth Phillips, also advocates in his Teaching Kids to Sing with the following: “Part of the job of the vocal-music instructor must be to communicate to students the need for proper vocal hygiene as it involves the proper use and care of both speaking and singing voices.” Teaching proper, healthy and efficient technique can likewise prevent many vocal health concerns. The Vocal Health Quiz included in Appendix B is a tool that educators can implement directly with students of singing to begin dialogue about healthy and unhealthy vocal practices.

Among many strategies to promote vocal health, one of the most effective and least expensive is the consumption of water. Research has found that hydration improves the function of the vocal folds and the singing mechanism, as well as the efficiency, quality and appearance of the vocal folds.¹¹ ¹² To this end, Karen Wicklund, singer, speech-language-pathologist and author recommends that singers drink half of their body weight in fluid ounces of water per day to keep their voices properly hydrated.¹³ Reducing the body’s fluid, however, even for a short period of time, results

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¹⁰ Morton Cooper, Change your voice, change your life (New York: Macmillan) 1984, 166-167.
in increased phonatory effort, according to Fisher et al.\textsuperscript{14} Clearly, one should not overlook the usefulness of sufficient water consumption.

In addition, good vocal hygiene dictates appropriate warm-ups and rest. Most vocal educators advocate warming up the voice before strenuous vocal use. In a study of non-professional voice users with pathologies, implementation of vocal warm-ups improved self-perceived and expert rated voice quality.\textsuperscript{15} In addition to warming up the voice, singers must know their vocal limits and use their voices in moderation.\textsuperscript{16} If the voice becomes fatigued and displays evidence of hoarseness, the singer has surpassed her vocal limit. Although the human voice is relatively resilient, it still needs vocal rest, not only during sleep but also through the course of the day.\textsuperscript{17} Warm-ups and rest are crucial to healthy singing.

Finally, prescription and nonprescription drugs present other considerations for vocal health. Limiting exposure to smoke, alcohol and caffeine has a beneficial effect on the voice. Any of these substances can dry out and agitate the mucosal membrane. Furthermore, most alcohol contains histamines, which can exacerbate pre-existing allergic reactions and swelling in the larynx.\textsuperscript{18} Awareness of side effects of medicines is likewise important for voice health. Certain medications, such as antihistamines, may

\textsuperscript{17} Ibid, 128.
have a significant drying effect on the voice, and aspirin can make the voice more susceptible to hemorrhage.\textsuperscript{19} Singers need to pay close attention to how the substances they introduce into their bodies will affect their voices. A more extensive list of medications and their effects on the voice are found in appendix four of Karen Wicklund’s text as well as chapter eleven in Rachel Gates, Arick Forest and Kerrie Obert’s text.\textsuperscript{20}

**RESPIRATORY HEALTH**

Foreign substances have an impact not only on singing but also, more generally, on breathing. Tobacco smoke and other inhaled substances can lead to edema, i.e., swelling, and other diseases, including emphysema and various cancers.\textsuperscript{21} The lungs are hardy organs and can bounce back from mild abuse. A pack of cigarettes per day for ten years, however, is when the lungs pass the “point of no return.”\textsuperscript{22} In addition to refraining from purposefully putting harmful inhalants into the body, one should limit one’s exposure to environments that have respiratory irritants. Such irritants include dust, paint fumes, insecticides, car exhaust and other pollutants.\textsuperscript{23} Prolonged exposure to cold air can even shock and dry the air passage ways. Consequently, Wicklund recommends breathing through a scarf to warm the air and lessen the effect of the cold.

\textsuperscript{19} Wicklund, 173-179.
\textsuperscript{21} McCoy & Halstead, 138.
\textsuperscript{22} Ibid, 139.
\textsuperscript{23} Wicklund, 96.
air. She recommends also the use of a humidifier or vaporizer during the cold months.\textsuperscript{24} Like a healthy voice, a healthy respiratory system is essential to the singer.

HEARING HEALTH

Sound bombards the ears during childhood and adolescence, whether it be from conversation on the school bus or shouting across the cafeteria table. The background noise over which adolescents have to project can be startling. The combination of everyday strain and other voice uses --- singing in choir, performing in plays or musicals, being a cheerleader or athlete, singing with the radio and working in fast food --- create a recipe for vocal danger. Adolescents cannot avoid all noise pollutants in their daily lives. However, they can and should control as many as possible. It is generally accepted that prolonged noise over 85 decibels (dB) will damage hearing, thus, higher amplitudes of noise can pose serious consequences.\textsuperscript{25} For perspective, a lawn mower produces amplitudes around 90dB.\textsuperscript{26} People who live in continuously noisy environments are more likely to experience higher stress levels than those in quieter environments.\textsuperscript{27} Singers are exposed to quite a bit of stress as it is, with the pressures of performance, and the added stress of noise could start a negative chain reaction on the entire body’s health.

\textsuperscript{24} Ibid.
\textsuperscript{25} Arline L. Bronzaft and Stephen B. Dobrow, “Noise and Health: A Warning to Adolescents,” Children;\textquotesingle s Environments Quarterly 5, no. 2 Adolescence and the Environment (Summer 1988), 40.
\textsuperscript{27} Bronzaft, 40.
Adolescence is also the time when hearing sensitivity begins to decrease, due in part because of the exposure to noise in one’s environment. In a study of 18,000 adolescents researchers found a “steady increase in the percentage of students having sensorineural hearing loss with age (6 to 18 years), as well as evidence of hearing loss four times higher in males than in females.\textsuperscript{28} A possible cause for the hearing loss being higher in males than in females could stem from the stereotypical pastimes associated with young boys including: listening to loud music, playing loud video games, hunting, riding ATV’s or dirt bikes, and so on. Research also found that the average sound levels of portable listening devices of pedestrians studied were 110dB.\textsuperscript{29} These sound levels can cause hearing damage over long periods of exposure. ASHA, the American Speech-Language-Hearing Association, provides startling statistics about hearing loss in young people. They claim that research as of 2013 has found “approximately 5.2 million children and adolescents aged 6-19 years have noise-induced hearing loss.”\textsuperscript{30} Noise-induced hearing loss is cumulative and permanent.\textsuperscript{31} Moreover, noise has not decreased over time but rather has continued to increase. For example, in the 1940’s citizens of New York City could easily hear the relatively low amplitude of the bell on a firetruck; by the 1960’s the siren had to reach 88dB. Today, many police cars have to use sirens with amplitudes of near 122 dB in order to alert citizens.\textsuperscript{32} ASHA gives three

\textsuperscript{28} Ibid, 42.
\textsuperscript{29} Ibid.
\textsuperscript{30} ASHA.
\textsuperscript{31} Ibid.
\textsuperscript{32} Bronzoft & Dobrow, 42.
strategies to improve hearing hygiene. First, block the noise with ear plugs. Second, avoid the noise. Third, turn down the volume.\textsuperscript{33} The efforts adolescent singers make toward preserving keen hearing will be greatly rewarded over a lifetime.

How does hearing health affect singing? Greatly; it impedes singing. Hearing loss can lead to intonation issues with instruments or other singers. Tuning is of upmost importance in the professional music world. If one cannot sing in tune, one does not get hired. Thus, for adolescents aspiring to sing professionally, to attend college for singing, or even to be cast in their high school’s musical; hearing loss lowers their chance for success.

\textbf{VOICE CARE TEAM}

What does one do when, despite prevention efforts, a voice pathology or dysfunction is present? In order to have success with the treatment of dysphonia in young voices, one must, according to voice specialist educator Leon Thurman and speech-language pathologist Carol Klitzke, address not only the technical and habitual changes that need to occur but also the influences of psychosocial experiences that could have led to the problem. Addressing and changing detrimental behaviors affecting the voice is likewise essential.\textsuperscript{34} It takes more than one individual to effect change of

\textsuperscript{33} ASHA.
behaviors, especially with an adolescent; thus, it would be time to utilize the voice care team.

The voice care team for an adolescent singer is composed of an laryngologist-ENT (MD), an speech-language pathologist (SLP), a singing-voice specialist (SVS), a voice teacher or choir director, and the parent or guardian of the adolescent.\textsuperscript{35} Since the needs of each individual are different, not every voice care team necessarily has all of these members, and some may include others like psychologists or psychiatrists, if needed. All of these members must communicate with each other to establish clear, consistent goals and expectations for the young singer, though the SLP and SVS generally take the lead in the rehabilitation of the singer. Structure, persistence and consistency are the best ways to effect change in vocal behaviors, if the dysphonia stems from misuse. Some dysphonia requires medication and a change of diet, as in the case of acid reflux. Others need the comprehensive treatment of the voice care team.

Vocal health and hygiene are at the core of preventing vocal injury in adolescents, but awareness of vocal changes and education on proper technique are the keys to building a healthy voice with longevity. The following chapter presents existing pedagogic techniques for adolescent singers.

\textsuperscript{35} Wickund, 67-76.
CHAPTER 3:
REVIEW OF LITERATURE: VOCAL TECHNIQUE & PEDAGOGY

INTRODUCTION

Among researchers and music educators, two are best known for work concerning adolescent singing voices: John Cooksey and Lynne Gackle. Cooksey’s work focuses on the adolescent male voice while Gackle’s revolves around the adolescent female voice. They have made outstanding contributions to understanding the development of the adolescent voice, among other things. Others too---Kenneth Phillips, Frederick Swanson, Duncan McKenzie, Irvin Cooper and Robert Edwin---have contributed significantly to the field. Offerings of note from dissertations and theses have been made by Linda Reis, Brittny Kempfer, Catherine Ashmore and Maria Denison. All of the above are known for their work with adolescent singers, research involving the adolescent singing voice, or both. They highlight technical aspects of building a voice that are at the same time realistic and achievable for the adolescent singer. Major contributors to the world of vocal pedagogy at large are, of course, Richard Miller, Barbara Doscher, William Vennard, James McKinney and Scott McCoy. Though these authors and pedagogues are extremely important to the profession, for this project I highlight authors who have made substantial contributions specifically to the pedagogy of the child and adolescent singing voice.
VOICE MUTATION AND STAGES OF DEVELOPMENT

The Duncan McKenzie Approach

Duncan McKenzie’s 1955 book *Training the Boy’s Changing Voice* challenged decades and even centuries of thought regarding participation by boys in singing during their voice change. He not only encouraged boys to sing during their voice change but also developed the concept of vocal stages that occur during the mutation. For this review, I focus on *Part One* of the book, which most relates to the mutation of the male voice. In *Part Two*, McKenzie focuses on implementing his concepts in various ensemble situations. This concept of vocal stages, known as the alto-tenor plan, consists of soprano II, alto-tenor, tenor, and bass.\(^\text{36}\) The term alto-tenor refers to the stage of a boy’s voice change when the voice has lowered and is beginning to develop.\(^\text{37}\) The range is neither alto nor tenor but rather a bit of both, with a quality not as masculine as a developed tenor voice.\(^\text{38}\) McKenzie writes that too much use of the chest voice during preadolescence can lead to greater vocal problems during adolescence, especially during the vocal mutation.\(^\text{39}\) He does not, however, define chest voice other than referring to it as “shouting.”\(^\text{40}\) In criticizing too much use of chest voice, McKenzie apparently is addressing good vocal habits and hygiene rather than what would now be categorized as vocal registration.

\(^{37}\) Ibid, 19.
\(^{38}\) Ibid.
\(^{39}\) Ibid, 25.
\(^{40}\) Ibid.
McKenzie’s concepts of the voice lowering and its stages are quite interesting. He first believes that the speaking voice and changing range of the speaking voice is a good indicator of the progress of the singing voice and does indicate that the speaking voice always lowers first. Once the lowering process has finished, the voice will often move back up a few steps. This final upward movement, claims McKenzie, is an indication of the voice settling. Pre-pubescent vocal classifications and ranges of boy’s voices are Soprano I (C4-G5) and Soprano II (B3-E5). As the voice’s tone color begins to change, the subject should be classified Sop II. When the boy then starts to lose some of his top notes, he should be transferred to Alto (A3-C5). At this stage, the tone color is comparable to a female contralto but lacking depth.

McKenzie believes that the speed of lowering can be an indication of the settled voice’s classification. Thus, if a voice lowers rapidly, in under a year, for instance, the final classification is likely to be a bass. If the voice lowers more slowly, taking from a year to 18 months, the voice is likely to develop into a tenor. McKenzie stresses throughout his writing is that healthy vocal habits must be employed in every changing voice, and during each stage of the voice change. Singing in a comfortable tessitura is paramount. In this text he also provides some exercises to use during the voice change as well as suggested voice tests to determine appropriate classification and vocal stages.

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41 Ibid, 27.
42 Ibid, 28.
44 McKenzie, 30-31.
The Irvin Cooper Approach

In 1965, the next significant contribution to the topic of the changing voice came in the form of Irvin Cooper’s book *Teaching Junior High School Music: General Music and the Vocal Program.* Cooper developed a quick vocal test that one could execute in a single class period to determine voice classification. Another of his discoveries was the “octave aural illusion.” The “octave aural illusion” is the impression given by the overtones of a boy’s changing voice that he is singing an octave below the fundamental pitch. Cooper refers to singers with this quality as “false baritones” and gives them the classification “cambiata.” The word *cambiata* comes from Latin and translates to change, an appropriate label for boys whose voices had begun their mutation.

According to Cooper’s classification system, educators of boys with unchanged are advised to divide these singers soprano I and soprano II. The “false baritones” and boys who are in the first stage of their voice change should be classified as “cambiata”. The baritones are the boys whose voices have already changed.

One of Cooper’s other contributions regarding the changing male voice and junior high choral repertoire was the inception and foundation of the Cambiata Press, prints choral arrangements for this particular population with the cambiata voice in

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46 Ibid, “Chapter 3,” 31-100.
48 Cooper, 18 & 22-23.
49 Ibid., 34.
mind. So, instead of SATB divisions, there are SSCB (sop I, sop II, cambiata, baritone) divisions with comfortable ranges for the changing voice being a high priority.

The Frederick J. Swanson Approach

Part III, “The Boy Challenge,” in Frederick Swanson’s book titled *Music Teaching in the Junior High and Middle School* (1973) discusses physical changes of the voice, patterns to these changes, as well as the training and care of the changing voice. Swanson is confident that boys experiencing voice change can sing through the mutation, provided their music teacher is knowledgeable, intuitive, and considerate of the needs of each voice. To that end, Swanson encourages the use of vocal testing in order to identify each boy’s vocal category. He found through observations and recorded data of 82 eighth grade boys that the subjects all fell into one of four categories of mutation. The categories that appeared were (1) voices with only treble tones (unchanged voice); (2) voices with only bass-clef tones with a limited range (changed voice); (3) voices with treble and bass tones, but a hole in the middle (changing voice); (4) voices that could sing in both clefs with some overlap (changing voice). Swanson speculated that music educators could tailor classes to cater to the

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51 Cooper, 422-423.
53 Swanson, 174.
particular needs each group of boys, regarding repertoire and exercises. His book is full of anecdotal situations that one may experience in a middle school choir along with ways to approach those situations to best instruct the changing voice. However, a chronological developmental approach to this pattern concerning singing and teaching techniques is lacking, though Swanson does present specific ranges for each category. In his appendix, he provides individual results from the 82 students.

**The John Cooksey Approach**

Perhaps John Cooksey’s early contributions to the field are his greatest. Starting in late 1977, he published a series of four articles in the *Choral Journal* titled “The Development of a Contemporary, Eclectic Theory for the Training and Cultivation of the Junior High School Male Changing Voice.” In the first of the four articles, Cooksey identifies the theories of male voice change of his predecessors in the field, namely, Cooper, Swanson and McKenzie. He also passionately introduces the concept and need for an eclectic approach to teaching this population of vocally vulnerable boys. The need to share freely experiences and research across the medical and scientific fields is set forth persuasively. He believes this cooperation will properly serve this population by keeping boys engaged and excited about singing during the mutation.

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54 Swanson, 186-187.
Part II of the series begins with scientific findings relating to the hormonal changes that cause puberty to occur, as well as the physical changes that result. Many authorities believe that voice change and sexual development are intricately linked.\textsuperscript{56} The age at which voices change in males is the subject of much debate. Since Cookey’s publications, more contemporary researchers like Bellis, Downing and Ashton have charted the pubertal onset trends as lowering in age significantly during the past 150 years, with a drop of three years in the past century.\textsuperscript{57} The scientists agree that voice change usually spans a year or longer with additional time for the voice to stabilize.\textsuperscript{58} In Janice Killian’s study of fifth- and sixth-grade singers, she found that half of the fifth-graders tested were in one of the first four of Cooksey’s stages of voice change, and that all stages were represented in the sixth-graders tested.\textsuperscript{59} Cooksey also states that the change and settling of the speaking voice is a relatively faster process than for the singing voice.\textsuperscript{60} This is no surprise, since the intricacies of coordinating the singing voice are logically more difficult for the new physiology to navigate than speaking.

In addition, Cooksey includes information from a Czechoslovakian study from the early 1960’s that tracked voice changes beginning at the age of thirteen and ending at

\textsuperscript{56} John Cooksey “The development of a contemporary, eclectic theory for the training and cultivation of the junior high school male changing voice; Part II: Scientific and empirical findings; some tentative solutions.” \textit{Choral Journal} 18, no.3 (1977b): 6.
\textsuperscript{58} Cooksey. (1977b): 8
\textsuperscript{60} Cooksey, (1977b): 8.
the age of fifteen. The data pointed to three stages of mutation with distinct characteristics of each stage.\textsuperscript{61,62} The first stage called the “Beginning of the Change,” is characterized by a striking loss of high notes and changes in the thyroid cartilage, epiglottis and vocal cords. The second stage, called the “Crux of the Change,” involves a restriction of the voice range and prominent thyroid cartilage. The third and final stage is the “End of Change” and consists of the voice reaching its full depth and the beginning of range extension. Maximal growth of the vocal cords is reached during this stage, as well as maximal growth of the larynx.\textsuperscript{63}

Building upon the aforementioned research and other studies examined, as well as his own personal experiences and observations, Cooksey conceptualizes a five-stage process in voice development, defined by both physical and vocal characteristics. Stage I, called “Premutation,” is the period when the average speaking voice is C4 and the singing voice exhibits a beautiful soprano sound.\textsuperscript{64} Stage II, named “Early Mutation,” occurs when pubertal changes are initiated. The speaking voice starts to lower and the quality becomes darker, rougher or both. The singing voice has a variable loss of the high notes and increased strain and breathiness above C5.\textsuperscript{65} Stages III and IIIA are called “High Mutation.” The speaking voice lowers further in pitch, to A3 on average, and the quality of the voice becomes huskier. The singing voice loses agility and becomes more

\textsuperscript{61} Cooksey, (1977b): 8-11.
\textsuperscript{63} Ibid., 11.
\textsuperscript{64} Ibid., 12.
\textsuperscript{65} Ibid., 13.
unpredictable and uncoordinated. Poor vocal habits, Cooksey notes, are likely to arise at this time.\footnote{Cooksey, (1977b): 13.} The most significant vocal change that occurs during Stage IIIA is the voice often dropping a minor third and the baritone quality becoming more recognizable. Cooksey also states that this stage is relatively quick, only a few weeks to a couple months.\footnote{Ibid., 14.} Stage IV, the “Postmutational Period,” is marked by the beginning of the vocal settling. The speaking voice has lowered to E3/D3, but the adult timbre is not complete. The singing voice has the fundamentals of the adult instrument as far as physiology, but resonance, intensity and timbre are not fully developed. Singers in this group demonstrate limited agility as well as difficulty in negotiating fast moving intervocalic leaps of more than a 4\textsuperscript{th} or 5\textsuperscript{th}.\footnote{Ibid.} The final stage in Cooksey’s voice change model is Stage V, “Early Adult Phase.” This stage is a continuation of the voice settling, a building of vocal coordination and the resonance and timbre of the voice becoming closer to the adult model. This final stage can extend for an undetermined amount of time, usually continuing after high school.\footnote{Ibid.} Cooksey emphasizes that any voice training that occurs during the vocal change must begin with the use of a comfortable range regardless of which stage of change the voice is experiencing.

In addition to developing the male mutational stage classifications, Cooksey also proposes several important pedagogical considerations for these boys. He suggests that vocal tests need to occur regularly to determine stage of voice change. Testing informs

\footnote{Cooksey, (1977b): 13.} \footnote{Ibid., 14.} \footnote{Ibid.} \footnote{Ibid.}
the choral director of the appropriate range, tessitura and limitations of each boy. To build confidence with the boys, they should, Cooksey suggests, sing in their best range during the voice change.

Part III in Cooksey’s article series focuses on implementing the knowledge of the previous articles to develop an approach to teaching the singer during his voice change. One of the first steps he outlines is to classify each voice based on stage of voice mutation. This classification is achieved through a vocal range test, as well as taking into consideration tessitura and voice quality. 70

Since each voice and each voice change is unique, Cooksey acknowledges there can be some range and tessitura variation in individual voices, but the characteristics and pattern remains the same across the entire affected group. 71 He goes on to present a testing model for educators to use in determining each student’s stage group and also includes exercises to use with the changing voice, explaining the function of each exercise. One should avoid prolonged use of the falsetto register before the voice is fully settled to help prevent poor vocal habits from emerging during the period of time when proper re-coordination of the voice is paramount. 72

The final installment of Cooksey’s four-article series centers on choosing repertoire for the male changing voice. As a guideline, comfortable range and tessitura

72 Ibid., 15.
of the voice must take precedence. Also, repertoire for the changing voice needs to avoid prolonged phrases, sudden or numerous register transitions and passages demanding excessive agility. If one heeds these concerns, compensatory tensions and poor vocal habits are less likely to emerge in the young voices, which can decrease the likelihood of vocal injury and trauma.\textsuperscript{73} Cooksey presents resources and publishers, such as the Cambiata Press, as good examples of choral music for the male changing voice.\textsuperscript{74}

**The Lynne Gackle Approach**

Through her research and subsequent publications, Lynne Gackle developed the first significant contributions to the literature regarding pubertal vocal changes in the adolescent female singing voice. In her 1991 article “The Adolescent Female Voice: Characteristics of Change and Stages of Development,” she first highlights the importance of awareness among music educators of this population: awareness of physiological changes that occur during this period of time as well as knowledge of and respect for these singers’ vocal limitations.\textsuperscript{75}

The female adolescent voice change exhibits the following symptoms described by Gackle: insecurity of pitch, noticeable register breaks, increased huskiness, decreased range and inconsistency in range, voice cracking, hoarseness and uncomfortable singing.

\textsuperscript{73} John Cooksey “The development of a contemporary, eclectic theory for the training and cultivation of the junior high school male changing voice; Part IV: Selecting music for the junior high school male changing voice.” *Choral Journal* 18, no.5 (1978): 7.
\textsuperscript{74} Ibid., 12.
or difficulty in phonation, characteristics similar to the male voice mutation.\textsuperscript{76} A physical and aural indication of female voice change is the “mutational chink.” This occurs during laryngeal growth when there is incomplete vocal closure at the posterior portion of the vocal folds resulting in a husky tone.\textsuperscript{77} The work of Alderson (1979) speculated that this chink was caused when the vocal folds outgrow the surrounding muscles resulting in the inability of the vocal folds to close completely.\textsuperscript{78} In addition, a slight descent in tone at the lower end of the vocal range, usually around a third, characterizes the female voice change because the larynx becomes larger. Gackle further comments on the age of puberty occurring earlier than previously recorded, on average three to four months earlier per decade.\textsuperscript{79}

One perceives the female voice change, Gackle explains, as “shades of change”: changes in richness, depth and warmth in the overall color of a treble sound.\textsuperscript{80} She recommends that during the female voice change, it may be beneficial to the singer to temporarily shift to a lower voice part to help guard against vocal strain and vocal discomfort during the change.\textsuperscript{81} In Gackle’s, she used the following criteria to determine the categories: speaking pitch, vocal range/tessitura, register breaks and voice quality.\textsuperscript{82} Stage I is titled “Prepubertal,” and is characterized by a speaking pitch of C4-D4. Singing

\textsuperscript{76} Ibid., 18. \\
\textsuperscript{77} Ibid. \\
\textsuperscript{79} Gackle, 20. \\
\textsuperscript{80} Ibid., 21. \\
\textsuperscript{81} Ibid. \\
\textsuperscript{82} Ibid.
voice qualities include no clear register breaks, agility remaining and a light soprano timbre. During Stage IIA, titled “Pubescence/Pre-Menarcheal,” the average speaking pitch drops a semi-tone to a whole step, and breathiness seeps into the singing voice. Also, a register break between G4 and B4 appears.\(^{83}\) Stage IIB, “Puberty/Post-Menarcheal,” is described as the most critical time during the female voice change. At this stage the voice changes in weight, timbre, range and tessitura.\(^{84}\) Stage III, titled “Young Adult Female/Post-Menarcheal,” is comparable to Cooksey’s Stage IV in the male model; it is a time when the voice begins to settle. Gackle describes Stage III as the increase of vocal range, more consistency between registers, decreased breathiness, and increased volume, resonance and agility, with a vocal timbre closer to the adult female voice. Approximate register changes found at different stages of development in the female adolescent voice are included also.

In her dissertation “The Effect of Selected Vocal Techniques for Breath Management, Resonation, and Vowel Unification on Tone Production in the Junior High School Female Voice,” written in 1987, Gackle provides insight into how targeted vocal exercises can alleviate some of the vocal symptoms associated with the female voice change. Observed successes were an increase in phonation duration and decrease in pitch perturbation.\(^{85}\)

\(^{83}\) Ibid., 22.
\(^{84}\) Ibid.
The Kenneth H. Phillips Approach

*Teaching Kids to Sing*, published in 1992 and authored by Kenneth Phillips, is a well-organized and thoughtful text that functions as much as a vocal planning guide as a provider of useful information about the young voice. Chapter 3, “Vocal Parameters,” and Chapter 4, “The Child and Adolescent Singer,” will be the focus of this literature review. Phillips is one of few authors to address the voice change in the female voice. He describes the physical and vocal characteristics of the female voice change as being less dramatic than that of their male counterparts, mainly because the pre-pubertal and post-pubertal female larynx changes in size less than the male larynx. Some of the vocal characteristics of the changing female voice are increased breathiness or lack of clarity, which, he assures, can be a temporary state if proper technique is employed.\(^{86}\)

Regarding boys singing during the voice change, Phillips supports its appropriateness and has an interesting viewpoint on the use of registers during this period of time. He believes that the pure upper register (boy soprano register) should continue to be used until the voice has settled.\(^{87}\) He reasons that continued use of the upper voice would strengthen that register and, when the voice settles, will be a tool in creating a passaggio to connect with the chest voice. Phillips also claims that the changing boy voice should not be limited to a small vocal range but rather that encouraging the subject to work out register problems will allow singing with a wider


\(^{87}\) Phillips, 49.
range.\textsuperscript{88} Boys should, Phillips believes, abandon their pre-pubertal mixed voice in favor of the two register model; from D3 downward should be sung in the lower voice (changed voice), and from E3 upward should be sung in the upper voice.\textsuperscript{89} A unique offering of Phillips’s is his range and tessitura parameters, based on eventual voice types. A table of these parameters is included at the end of the chapter. His prescribed parameters present some questions about some of Phillips’s earlier statements about the usage of a wide range. For some of these changing voices, there is a limited tessitura. Thus, if the singers attempt to sing a wide range, would not vocal strain and possibly poor compensatory habits begin to emerge?

In chapter 4, Phillips begins his discussion of the changing adolescent voice, urging teachers of these children to be intuitive, persistent, informative and, more than anything, trustworthy.\textsuperscript{90} Regarding the male changing voice, he presents the aforementioned approaches of McKenzie, Cooper, Cooksey and Swanson. He also introduces Sally Herman’s “Voice Pivoting” approach. The idea of this approach is to pivot the changing voices around to the various vocal lines that lie in the most comfortable range of the particular singer.\textsuperscript{91} For example, one may begin a piece on the alto line, pivot to the tenor 1 line, then pivot to the tenor 2 line, and so on.

Some of the first signs of the female voice change are huskiness or unsteadiness of the speaking voice, caused by the thickening of the vocal folds, and an increase of

\textsuperscript{88} Ibid., 50.
\textsuperscript{89} Ibid., 51.
\textsuperscript{90} Phillips, 75-76.
\textsuperscript{91} Ibid., 81.
breathiness in the voice.\textsuperscript{92} Phillips encourages teachers to continue vocalization in the upper register in an attempt to prevent the disconnection of that register in lieu of a chest dominant production. Gackle’s three-stage model for classifying the changes of female voice development is also provided.\textsuperscript{93}

**Comparison of Approaches**

From the literature reviewed, several points of convergence emerge. First, all agree that music educators of adolescents must be informed about the voice change, teach their students about the voice change, and be aware of the vocal needs and limitations of each student, especially during the periods of greatest vocal instability. All believe that voice change begins at the onset of puberty and is a process unique to each individual. They also recognize that most published repertoire for the choral ensemble is not adequate to serve the changing voice, particularly the male voice because of the constantly changing vocal needs of the population. While the various authors may have distinct classifications for the stages of voice development, they all acknowledge that a sequence of chronological stages occurs for all healthy singing voices undergoing voice mutation. Many also prioritize individual testing, group testing or both to determine which stage of development each voice is experiencing. With that knowledge, the teacher must choose appropriate repertoire for the changing voice, focusing on the importance of range and tessitura with this population. The importance of instilling

\textsuperscript{92} Ibid., 83.
\textsuperscript{93} Ibid., 83-85.
healthy vocal habits in singers going through the change is likewise subject to consensus. The authors believe that puberty is a time when singing fundamentals like breathing, posture, resonance, and diction are critical concepts on which to focus. They espouse that these concepts, along with singing in the proper range and tessitura, will prevent unnecessary strain on the voice and reduce the likelihood of unhealthy compensatory tensions which could be retained post-puberty.

Areas in which the authors disagree to some extent are the number of stages of voice development as well as some of the nuances within each stage, including differences in ranges and tessituras. The tables below articulate Cooksey, Phillips and Gackle’s mutational stages of development. Their guidelines, too, vary in popularity. Among contemporary authors, a large number employ the Cooksey approach to testing the male voice change. A debate between Swanson and Cooper is evident in several letters to the editor (see works cited for Cooper 1962 and Swanson 1962 & 1965). As for the female changing voice, there have not been theories or significantly opposing viewpoints to Gackle’s; thus, she remains the authority on the female voice change. Additional contributions have been made to the topic—such as those by William May and Bonnie Williams in their article “The Girl’s Changing Voice,” where they introduce certain speaking voice data, mainly the gradual lowering of the average speaking pitch of girls over a four-year time span. The girls fundamental speaking pitch lowered

95 May and Williams, 21-22.
gradually from an average frequency of about 266Hz (hertz) for 11 year-olds to 260Hz for premenarcheal 13-year-olds and 245Hz for postmenarcheal 13-year-olds and 237Hz for 15-year-olds.\textsuperscript{96}

**John Cooksey Male Mutational Stages**

<table>
<thead>
<tr>
<th>Voice Classification</th>
<th>Range</th>
<th>Tessitura</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I: Premutation</td>
<td>A3-E5</td>
<td>D4-C5</td>
</tr>
<tr>
<td>Stage II: Early Mutation</td>
<td>A3-C5</td>
<td>D4-B4</td>
</tr>
<tr>
<td>Stage III: High Mutation</td>
<td>G3-B4</td>
<td>A3-G4</td>
</tr>
<tr>
<td>Stage IIIA: High Mutation</td>
<td>D3-F4</td>
<td>F3-D4</td>
</tr>
<tr>
<td>Stage IV: Postmutational</td>
<td>C3-D4</td>
<td>D3-A3</td>
</tr>
<tr>
<td>Stage V: Early Adult Phase</td>
<td>A2/C3-E4</td>
<td>C3-B3</td>
</tr>
</tbody>
</table>

Table 3.1

**Kenneth Phillips Male Mutational Stages**

<table>
<thead>
<tr>
<th>Voice Classification</th>
<th>Range</th>
<th>Tessitura</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unchanged Tenor 1</td>
<td>B3-F5</td>
<td>D4-D5</td>
</tr>
<tr>
<td>Changing Tenor 2</td>
<td>G3-G4</td>
<td>Bb3-F4</td>
</tr>
<tr>
<td>Newly Changed Tenor</td>
<td>D3-G4</td>
<td>G3-D4</td>
</tr>
<tr>
<td>Changing Baritone</td>
<td>D3-D4</td>
<td>G3-C4</td>
</tr>
<tr>
<td>Changing Bass</td>
<td>Bb2-F3 &amp; A4-C4</td>
<td>C3-E3</td>
</tr>
<tr>
<td>Newly Changed Bass-Baritone</td>
<td>A2-D4</td>
<td>C3-G3</td>
</tr>
</tbody>
</table>

Table 3.2

**Lynne Gackle Female Mutational Stages**

<table>
<thead>
<tr>
<th>Voice Classification</th>
<th>Range</th>
<th>Tessitura</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I: Prepubertal</td>
<td>Bb3-F5/A5</td>
<td>D4-D5</td>
</tr>
<tr>
<td>Stage IIA: Pubescence/Pre-Menarcheal</td>
<td>A3-G5/A5</td>
<td>D4-D5</td>
</tr>
<tr>
<td>Stage IIB: Puberty/Post-Menarcheal</td>
<td>A3-F5</td>
<td>B3-C5</td>
</tr>
<tr>
<td>Stage III: Young Adult Female/Post-Menarcheal</td>
<td>G3/A3-A5/B5</td>
<td>A3-G5</td>
</tr>
</tbody>
</table>

Table 3.3

\textsuperscript{96} Ibid.
Even though some differences exist among these authors and their respective approaches to the voice change, the most important factors in working with this population remain the same throughout the literature. These boil down to educator sensitivity and knowledge. If music educators are knowledgeable about the voice change, they can guide and encourage their students through the process. If the teacher is sensitive to the needs and limitations of each singer, the singer will come out of the change healthy and with solid technical vocal foundations. On the other hand, educators who do not understand the process of voice change and are not sensitive to the needs of an individual going through voice mutation can cause many detrimental effects.

TIMING OF TEACHING TECHNIQUE TO ADOLESCENT SINGERS

Until around the early 1900's, consensus held that singing during the voice mutation was dangerous and would cause more harm than good. Specifically, Manuel Garcia believed that formal voice training should not begin until after puberty: age 16 for girls and 18 for boys.\(^97\)

Fortunately, attitudes have shifted, and through research and a better understanding of vocal development and function, it is now considered acceptable to teach technique and function to children at ages as young as eight in a group or individual setting. Eight is the age when the lungs have formed to the point they can

create enough subglottal pressure for sustained phonation. The much respected Otolaryngologists Dr. Robert Sataloff and colleague Dr. Joseph Spiegel concluded that singing should be possible at any age as long as the educator is considerate of the child’s vocal and mental limitations. They also stressed the importance of knowledge of vocal growth and development for those who teach children in order to minimize possible vocal risk and optimize training. In 2003, Richard Sjoerdsma, on behalf of The American Academy of Teachers of Singing in their “Teaching Children to Sing” document, states:

The American Academy of Teachers of Singing supports and encourages the teaching of children to sing. As in other activities in which youngsters are involved, singing can be accomplished on many levels from recreational to professional. At all levels, however, there should be qualified instructors willing and able to help young singers on their musical journeys.

Thus, the current general consensus is that it is possible to teach vocal technique to young, developing voices in a healthy and safe manner. Though there are no regulations currently in place to regulate the teaching of young singers, this author encourages music educators to proceed with extreme caution when working with this population, especially in an individual setting. In order to work technique effectively with young singers, the educator is urged to possess background knowledge in vocal pedagogy and physiology changes and the needs of the pediatric and adolescent voice. It is also incumbent upon the educator to demand of the student compliance in good vocal

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100 Richard Sjoerdsma,“Teaching Children to Sing,” Journal of Singing 59, no. 5 (2003), 378.
health and hygiene strategies. Further, educators must realize that there is a possibility of inflicting more harm than good with young singers. If the teacher attempts to force upon the student techniques for which the body is not prepared, long-term problems can develop. Also, not every adolescent is emotionally mature enough for private instruction. Thus, music educators are strongly encouraged to be selective when debating the acceptance of an unchanged voice into a studio.

**KEY PEDAGOGICAL CONCEPTS & TECHNIQUES**

Cooksey encourages development of the fundamentals of voice production: resonance, agility, flexibility, and so on. He also stresses the importance of choosing proper repertoire.101 Cooksey is cautious against of overuse of the falsetto voice during the voice change because it could interfere with the development of the voice. In contrast, Swanson believes that the continued use of the falsetto register can be helpful for these boys to eliminate the break that occurs when they shift from treble to bass, as well as remedying the constant issue of not having enough tenors.102 He is not alone in this viewpoint. Phillips also supports the continued use of the falsetto register until the voice is settled.103

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In building vocal technique with children, Phillips describes five essential components: breathing, phonation, resonance, diction and expressiveness. He believes that, though the adolescent voice is constantly changing, breathing can be mastered by kids.\textsuperscript{104} He is a bit bolder than some of his fellow pedagogues in that he suggests formal instruction starting at the age of eight, preferably in a group setting. Also, voice training should not be limited to a choral setting.\textsuperscript{105}

Swanson’s instructions and suggestions are geared toward a group and choral settings rather than private instruction. Several methods he has found effective include imitation, mechanics, and tonal imagery. The four foundational mechanical aspects of technique he suggests for group settings are posture, a relaxed throat, correct placement of vocal tract to improve resonance and quality, and the use of head voice to extend range and improve quality.\textsuperscript{106}

Edwin works constantly with child and adolescent singers in private lessons and shares his opinions on working with this group. In his article “Vocal Parenting,” he declares:\textsuperscript{107}

I teach children and adolescents how to sing. I have found no medical or pedagogical evidence to suggest that I am doing the wrong thing. I have found no evidence to suggest that waiting until children are fourteen or sixteen years old before they begin private study is a good idea. We don’t lock children in a room and refuse them other physical and creative activities. Why then deny them this one? As long as we remember that they are children with immature

\textsuperscript{104} Phillips, 15-16.
\textsuperscript{105} Ibid, 17.
\textsuperscript{106} Frederick J. Swanson, \textit{Music Teaching in the Junior High and Middle School} (New Jersey: Prentice-Hall, Inc., 1973): 75-79.
minds and bodies and not adults, we are on sound pedagogical ground
developing good vocal and performing technique.

Essential technical work according to Edwin includes body alignment, breath
management, phonation, registration coordination, resonation and articulation. He
believes that all of these elements can be achieved through storytelling (i.e. imagery).\textsuperscript{108}

The dissertation of Reis is extremely well-organized and a great compilation of
the research that has been done on the adolescent voice. In chapter two of her
document, she shares a thorough historical perspective on vocal pedagogy.\textsuperscript{109} Denison's
dissertation looks at voice science as a means of developing pedagogical approaches to
the pediatric voice. She examines how empirical research has influenced vocal
pedagogy. So that children are given the opportunity to develop the laryngeal
coordination to develop into singers, Denison believes that music educators should
think of singing as a learned skill rather than an innate ability.\textsuperscript{110}

The thesis by Kempfer focuses on contemporary commercial music (CCM)
pedagogy for adolescents by developing healthy technique. In chapter six of her
document, she develops and compiles vocal exercises with different mechanical goals
and registers in CCM voice production including: belt, thyroarytenoid dominant (chest
voice), cricothyroid dominant (head voice), mix, and so on.\textsuperscript{111}

\textsuperscript{109} Linda Ardelle Ries, “The Child Singing Voice as Social Construct: Physiological, Pedagogical, and Social
\textsuperscript{110} Maria Fenty Denison, “Pediatric Voice: Delineating the Voice Science and Investigating Child Training
\textsuperscript{111} Brittny Kempfer, “Contemporary Commercial Music Pedagogy: Selective Exercises for Developing
While all of these pedagogues have their own unique viewpoints in teaching technique to adolescent singers, their work does offer common themes. All espouse that proper breathing is essential to building technique and is achievable for all kids, especially after the age of eight when their lungs are more fully developed.\textsuperscript{112} Relaxation, posture, resonance and diction were also commonalities among these pedagogues. They all are also realistic about the limitations of these voices, in their choices of technical ideas presented.

\textsuperscript{112} Phillips, \textit{Teaching Kids to Sing}, 12.
CHAPTER 4:
ADOLESCENT VOCAL INJURY & PATHOLOGY

Though often quick to rebound, the adolescent voice can sometimes succumb to injury or pathology. Since adolescents participate in so many different arenas, especially due to the current trend of over-scheduling of our 21st century world, vocal dangers can stem from a vast array of sources inside and outside of voice-specific activities. Extracurricular activities, peer activities, work demands, their environments as well as influences in the home offer frequent settings of vocal misuse and poor vocal hygiene. I will highlight some of the most prevalent vocal injuries in adolescents as well as vocal injuries that could occur into adulthood if adolescents do not establish healthy vocal habits and hygiene. This chapter focuses on preventable disorders through proper care, though other disorders or pathologies are possible.

VOCAL NODULES

Extracurricular activities, like cheerleading, that require prolonged and high amplitude voice use can adversely affect the voice. Adolescent cheerleaders not only yell their cheers, but also to yell above a screaming crowd and athletes. This constant
overuse and misuse can lead to vocal swelling, and to the formation of nodules.\textsuperscript{113} Boone tells us that vocal nodules occur from repeated vocal trauma, are generally bilateral and are located in the anterior third of the vocal fold.\textsuperscript{114} The repeated vocal trauma causes swelling on the vocal folds and after a long enough period of time, benign callous-like lesions are established. Some symptoms of vocal nodules are breathiness, lowering of speaking pitch, lack of resonance, vocal fatigue, constant clearing of the throat, etc. However, vocal nodules can be asymptomatic and go undiagnosed without a laryngeal examination.\textsuperscript{115}

The Childhood Behavior Checklist (CBCL/4-18) scale was used in the study by Roy et. all to determine if certain behaviors made the likelihood of vocal nodules higher.\textsuperscript{116} The authors used a standardized parent-rating scale with strong psychometric properties. The most significant difference between the children with vocal nodules and the control group of children involved their extracurricular or social activities. The study found that aggressive behavior did not necessarily make the child more susceptible to vocal nodules but that social interactions with friends or involvement in activities were much more to blame. Other factors like having older siblings, or the presence of reflux

\textsuperscript{115} Ibid.
disease could possibly contribute to the development and persistence of vocal nodules.¹¹⁷

A fairly universal theme emerged in the studies of prevalence and severity of vocal nodules, like Gramuglia’s GRBASI study. The at-risk pediatric populations for the development of nodules are pre-pubescent boys and teenage girls.¹¹⁸

Young people often seek out and desire employment during their middle to late adolescent years. However, the employment opportunities for adolescents are often limited to less than optimal vocal environments. In food service, a common type of employment for adolescents, employees often must vocally compete with much noise, leaving voices tired at the end of a shift. In retail and other service jobs, the voice receives little time to rest during a shift due to the demands of the job. Overuse and lack of vocal rest can lead to swelling and perhaps encourage the formation of the pathologies like nodules.

**HEMORRHAGE & POLYP**

Vocal hemorrhage occurs when a blood vessel close to the surface of the vocal fold ruptures and blood fills the local tissue.¹¹⁹ These lesions can result from a cough, throat clearing, or other trauma. Other factors, like the use of aspirins, alcohol, fever


and the menstrual cycle can also make the voice more susceptible to vocal hemorrhage. Sometimes if a blood vessel in the vocal folds bursts (hemorrhages) too many times, a polyp forms. Polyps can also occur from a single traumatic event.\textsuperscript{120} When the vocal folds hemorrhage or a polyp forms, some indicators are huskiness or even diplophonia (double pitch). If a student thinks he is experiencing a hemorrhage or polyp, they should immediately go on vocal rest and make an emergency appointment with a laryngologist to discover the extent of the lesion. Sometimes, the MD will recommend vocal rest to heal. Other times, especially if these lesions have occurred more than once, the MD will perform surgery to cauterize the blood vessel (with a hemorrhage) or remove excess tissue (in the case of a polyp).\textsuperscript{121}

**SUBSTANCE USE**

Peer activities inside and out of school can lead to unhealthy vocal habits, and misuse. One of the most detrimental peer activities occurring in adolescence is experimentation with cigarettes, alcohol, and other recreational drugs. With Reinke’s Edema, a disorder which occurs over a long period of time in smokers, fluid builds up under the vocal folds.\textsuperscript{122} A great example to share with adolescent students is “I Love to Smoke” from the cartoon *The Simpsons*, as sung by the chain-smoking sisters Selma and Patty. When educating adolescents about these serious disorders, sometimes humor

\textsuperscript{120} Ibid, 46.  
\textsuperscript{121} Ibid.  
\textsuperscript{122} Ibid, 43.
can help initiate these types of discussions. As Reinke’s Edema sometimes takes decades to manifest, it does not occur specifically during adolescence, though the habit of smoking most likely begins during adolescence. If music educators inform their singers about the danger of this disorder early in adolescence, perhaps more adolescent singers would refrain from smoking. In late adolescence, drinking is a common phenomenon, and experimentation with other substances is also common, though it generally declines into adulthood.123

HEARING DAMAGE

An important yet often disregarded environmental concern for young people’s vocal health is their exposure to noise and the effect is has on adolescent’s hearing and voices. The moment an adult walks into a primary, middle, or high school lunch room in the middle of a school day, sound bombards their ears, with amplitudes that can reach above 110 decibels (dB).124 For a bit of perspective, the Center for Disease control and Prevention (CDC) claims that prolonged exposures of over 85dB may cause hearing loss.125 A jackhammer and chain saw have decibel levels around 110dB.126 The people using heavy equipment wear hearing protection because they, their supervisors, or

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126 Ibid.
most likely the Occupational Safety and Health Administration (OSHA) understand the
dangers of extreme noise levels. Without hearing protection, a running chain saw can
damage hearing after only two minutes! However, youth and their supervising adults
do not use hearing protection, nor are there likely to be sound absorbing tiles or other
implements in place for their hearing protection. There is a great need for these items,
especially in public schools. As noise levels are raising, not falling into the 21st century,
this concern could turn into a severe problem for the generations to come.

**ACID REFLUX**

Factors in the home which can negatively affect vocal health revolve around
nutrition and wellness. Since our world seems to be one full of parents shuttling kids
from school to practice, to rehearsals, etc.; it is also in danger of becoming a fast-food
culture. A poor diet rich in fried and spicy foods may lead to acid reflux (GERD-
Gastroesophageal reflux disease), which can negatively affect the voice. Acid reflux
(GERD), or (LPRD- Laryngopharyngeal reflux disease) is the migration of the gastric acids
from the stomach up the esophagus, and in the case of LPRD, continues to move on the
laryngeal structures. Acid reflux can lead to the development of granulomas or
ulcerations on the vocal process (posterior portion of the glottis). In most cases, reflux
medication and changes in diet and eating habits resolve the vocal issues caused by this

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127 Ibid.
128 Wicklund, 137.
129 Ibid, 49.
disease. The eating disorder bulimia also endangers the adolescent voice. While all eating disorders are dangerous, bulimia is especially dangerous for singers. Large amounts of gastric acid in vomit causes edema (swelling) of the vocal folds and can result in irreparable loss of range, timbre and endurance.\textsuperscript{130}

\textbf{PSYCHOLOGICAL EFFECTS OF VOICE DISORDERS}

The physical effects and recovery process of voice disorders are only part of the equation in healing; one must also consider emotional and psychological factors. The loss of one’s voice can be devastating. A voice professional or singer feels this loss more acutely than others because of the vocal link to self-identity.\textsuperscript{131} Though the majority of adolescents who sing are not professionals, they still may strongly self-identify as a “singer.” If that identity comes into question because of a vocal injury or pathology, that young person may experience a severe emotional blow. Music educators must be aware of emotional distress caused by vocal injury and, if needed, refer the student to a counsellor or therapist so they can heal emotionally as well as physically. If a singer experiences emotional distress because of voice loss, a strong support network to help them through the injury, both physically and emotionally, will likely result in a better prognosis.

Since some vocal injuries and pathologies are unpredictable and indefensible, protection against all voice disorders, injuries and pathologies is impossible. Yet, many


\textsuperscript{131} Wicklund, 53-58.
are preventable through proper vocal hygiene strategies. Thus, this author strongly encourages music educators to become aware of disorders commonly associated with adolescent voices as well as the indicators of said disorders, including persistent hoarseness, abrupt voice loss, diplophonia, and so on. The next chapter will provide strategies to help prevent some of the disorders and pathologies in the current chapter as well as a course of action if vocal injury is detected.
CHAPTER 5: PREVENTION

Robert Edwin, a well-respected teacher of singing states that “Life is full of opportunities to abuse one’s voice and in [his] large private studio with an eclectic student body; damage control from voice abuse is an ongoing pedagogical reality.”

Vocal misuse runs rampant throughout our culture, from screaming at athletic events and slumber parties to shouting over loud crowds in restaurants, cafeterias, etc. The goal of a teacher of singing is not to try to eliminate all the vocal misuse in the world, but to educate and guide his/her students to use their instrument in a healthy manner. However, young people, even when informed, will abuse their voices. They will attend sporting events and concerts and sleepovers, etc. This informed student, however, learns to self-monitor, and begins to take notice of their vocal limits and is also dissuaded by their teacher from employing destructive vocal behaviors. If a young person does not comprehend a consequence for a behavior, what then prevents them from partaking in said behavior?

In order to prevent vocal injuries in adolescent voices in the 21st century, teachers of singing, parents, and the singers themselves must become aware of

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symptoms and sounds of the dysphonic voice. Wicklund describes some of the most
telling sounds and symptoms of the dysphonic voice. First: breathiness or huskiness in
range of the voice where it was not previously present; Second: phonation with more
than one pitch; Third: pitch or phonation breaks or range loss where it was not present
before. Any of the preceding characteristics should cause immediate concern.
However, important to point out is that breathiness does not always indicate dysphonia.
It may be a result of the developmental glottal chink, sometimes present in young
female voices.

Adolescence is the most essential time to target and change unhealthy vocal
behaviors which could lead to pathology through music educator prevention and
intervention. We have all heard “young people are impressionable” but do we
understand why? The phenomenon which psychologists call the “reminiscence bump” is
likely the cause. It involves the ability to recall experiences between the ages of 10 to
25 more clearly than events in any other period of life. This clarity of recollection does
not stem from a keener memory during this period; it is not even because the events
themselves evoke more saturated emotion than in other points of life. Researchers have
found that one recalls novel, emotional and important events no matter when they
occur, but adults recall the mundane events from adolescence more than from any

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134 Ibid.
135 M. Södersten & P. Lindestad, “Glottal closure and perceived breathiness during phonation in normally

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other time of life. Researchers speculate that the adolescent brain is more sensitive to events because of the increased release of the chemical dopamine during adolescence, a chemical released in tandem with strong emotions. Since ordinary events trigger strong emotions in adolescents, our memory engrains these events more than events at other periods of life.137 Thus, adolescence is a great time to instill healthy behaviors in our students; they are more likely to remember these strategies and will hopefully employ them later in life.

Prevention of vocal injury tends to overlap with hygiene, but perhaps some of the following strategies of prevention will enlighten the reader. First, we turn to Thurman, Kiltzke and Hogikyan’s “Cornerstones of Voice Protection.” Cornerstone 1: maintain the optimum amount of water in your body. This includes reducing or eliminating caffeine. They also suggest becoming aware of the humidity of air you breathe; air with low hydration can dry out the mucosal tissue protecting the voice. This cornerstone mirrors Wicklund’s recommendations stated previously. Cornerstone 2 focuses on keeping your energy levels balanced including: eating balanced meals, getting adequate rest and staying physically active. One of the other ways to keep emotionally balanced is to find multiple times a day to laugh. What a great way to protect ourselves from injury! Cornerstone 3: learn efficient vocal production and coordination. Become aware of some warning signs of unhealthy voice production including: vocal fry, pressed phonation, frequent glottal attacks, a speaking pitch too

137 Ibid.
high, too low, or produced with too much effort. Cornerstone 4: keep in good shape, particularly with musculature and respiratory systems. Cornerstone 5: make sure one balances voice use with voice rest. Cornerstone 6: When you notice signs that your vocal abilities have diminished in any way for 10-14 days, see help from a medical professional immediately.\textsuperscript{138} Though some of these concepts may be common sense, one should often revisit them, especially when we or our students fall victim to the whirlwind of life.

Despite the best efforts of singer and teacher, voice disorders and pathologies can develop. This is not an indication of failure. Sometimes, a vocal pathology presents itself without obvious cause. For example, vocal cysts sometimes flare for no apparent reason. Even if your student develops a preventable disorder or pathology, the teacher is not necessarily at fault. In this case, the role of the teacher has to change slightly, for the voice must heal and become habilitated. A voice care team can speed vocal healing and lead to a more positive outcome.

**VOICE CARE TEAM**

The voice care team for singing is comprised of several professionals who possess strengths in different areas and who work together on behalf of an injured singer to help habilitate and rehabilitate the singer. Leading authorities in voice and

singing concur that an injured singer has the best chance for recovery and a lesser chance of recurrence if a team of individuals collaborate in an effort to rehabilitate the singer. A joint statement from ASHA (American Speech-Language and Hearing Association), NATS (National Association of Teachers of Singing) and VASTA (Voice and Speech Trainers Association) affirms:

“The importance of the interdisciplinary management of speakers and singers with voice problems and disorders, with the management of speakers and singers with voice problems and disorders, with the management team ideally consisting of some or all of the following individuals: a laryngologist, a speech-language pathologist, and a singing teacher, and/or speaking voice and speech trainer.”

In the case of adolescents, parents must be included as well as choir directors or others who could have a strong influence on the rehabilitation and habilitation of the injured singer (e.g. coaches and peers).

When an injury is suspected, begin with a laryngologist. A laryngologist is an ear, nose and throat doctor who has had additional training in treating the voice. Most cities, especially those with strong healthcare networks, have one or more laryngologists with stroboscopic capabilities. The laryngologist will insert a laryngeal stroboscope (small camera with a flashing light) into the pharynx via a flexible nasoendoscope or a rigid endoscope in order to illuminate the vocal folds. The flashes of light synchronize to the frequency of vocal fold vibration, giving the illusion that the vocal folds are moving in slow motion. The effect of the strobe allows the laryngologist to see minute details of

139 Wicklund, 67.
the mucosal wave and the function of the vocal folds.\textsuperscript{141} This technology is especially important for singers because even the smallest abnormality on the vocal folds can make a huge impact on the function of the singing voice.

Another integral member of the voice care team is the speech-language pathologist (SLP). In an ideal situation, the SLP would also be a singer or at least work with the voice on a regular basis. SLPs strive to rehabilitate the voice through voice therapy sessions. They also help promote healthy vocal hygiene strategies so that the patient is less likely to have a recurrence of their disorder, especially if the disorder was from abuse or misuse. SLPs not trained in the singing voice should consult with a singing voice specialist (SVS) when a singing patient begins treatment. An SVS is, in most cases, formally educated in singing and has additional knowledge, training or certifications in vocal anatomy and physiology, speaking voice development, behavioral management of voice problems, etc. He or she works closely with the SLP and MD to implement therapeutic songs and exercises to help habilitate the injured singer.\textsuperscript{142} Currently, nationally recognized minimum requirements, certifications, or knowledge requirements do not exist for one to earn the title of SVS by organizations such as NATS, ASHA or VASTA. There are discussions about standards of competence for SVS candidates.\textsuperscript{143} However, training programs and workshops helping to prepare a would-be SVS do exist. Karen Wicklund, with the National Institute for Continuing Education in

\textsuperscript{141} Ibid.
\textsuperscript{142} Wicklund, 71.
\textsuperscript{143} Ibid.
Voice and Florida Center for Professional Health, developed a three-level SVS certification workshop. The Ohio State University has a comprehensive, interdisciplinary certification program which includes courses in speech-hearing sciences, otolaryngology, and vocal pedagogy for their Singing Health Specialization. The National Center for Voice & Speech offers an intensive summer vocology program through the University of Utah, which combines speech science, vocal pedagogy, medicine and theater training.¹⁴⁴

Beyond the former members mentioned, the voice care team is comprised of those who have the most contact with and in many ways, the most influence on adolescents. This list of people can vary greatly by individual; however, parents and guardians are at the top of this list. Parents have a lot of influence over their kids, even in the adolescent years. They also have much control over the activities in which their child takes part. For example, if a Laryngologist diagnoses a young girl with pre-nodules due to screaming at sporting events, the parent could encourage their child to implement an alternative to screaming, like using a whistle, or other types of noise-makers to show their school spirit. Parents can also be the mouthpiece for their child in explaining to other adults his or her needs for a full recovery from the vocal injury. Peers are a huge factor to whether or not the adolescent will recover from their vocal injury as well as the likelihood of recurrence. If the closest friends of the adolescents can support the implementation of healthy vocal habits and also support the recovery of their friend,

recovery prognosis is better than if they lack empathy and understanding. If those peers aid in the recovery of their friend, perhaps they themselves will gain heathier vocal habits and hygiene.

Regardless of the exact personnel of one’s voice care team, the most important aspect of this group is that they, as well as the injured singer, communicate and cooperate as a team for the common goal of working toward vocal health. Above that, the injured singer must be compliant and have the desire to implement changes to their vocal habits and hygiene. If he or she is not willing to cooperate, no efforts a team of a thousand voice care professionals can repair the ailments of any singer.

Prevention of vocal misuse and injury as well as rehabilitation of injured voices is not necessarily an easy task. Simply too many opportunities for misuse exist, whether from over-scheduling of activities, lack of vocal rest, or incessant noise. The first step to prevention is education. Music educators must make time to teach students about the voice: healthy habits, hygiene, and the consequences of misuse and abuse. (Use the Vocal Health Quiz in Appendix B as an activity to start a dialogue about vocal health.) Encourage singers to be involved in the process of education by tasking them with vocal health assignments. Have them track their daily or weekly voice use and evaluate areas to add vocal rest, etc. (See Appendix C: Voice Use Tracker as an example of a voice use log). Also, send information home about vocal health and warning signs of vocal misuse and injury. In Appendix D: Parent’s Guide for Healthy Voices, included is a guide for parents and guardians of adolescent singers to educate them on indicators of vocal
concern, as well as strategies to promote vocal health in the home. The goal is to reinforce healthy habits and to replace unhealthy habits with healthy ones. For the second step in prevention, the teacher must have the resources and the wherewithal to refer students quickly to laryngologists, SLP’s and SVS’s in the area. A quick search with proper filters on the American Academy of Otolaryngology’s website reveals 588 Laryngologists registered in the United States, and provides the appropriate contact information for all of the doctors listed. The ASHA website’s “Find a Professional” tab allows one to search for an SLP in a particular area with a specific specialty (e.g. voice) and provides contact information for those individuals.

If a student develops a disorder or pathology, it is not productive to blame the singer, but to show compassion, empathy and through guidance, lead these singers to a healthier, more sustainable vocal lifestyle.

CHAPTER 6: RECOMMENDATIONS FOR MUSIC EDUCATORS

CONSISTENCY OF TECHNIQUE

Knowledge, consistency and persistence are three of the most important aspects of teaching students of singing, regardless of age or level of technique or ability. Although some of the staples of technique may change at different levels of maturation and study, they should remain consistent in order to build a technique for each student.

While differentiation of instruction exists between collegiate and adolescent teaching, the formula I use for my college students differs from that which I use with adolescents. However, some crossover exists. The following sequence represents essential building blocks for a solid vocal technique for developed or newly developed anatomy: 1. Relaxation, 2. Posture, 3. Respiration, 4. Phonation, 5. Resonance and 6. Style.

Relaxation, regarding singing, is defined as the release of extraneous tensions which can adversely affect the vocal instrument. Any singer, however, must not eliminate all tensions because, after all, singing does require some tension for the instrument to function properly. The alignment of the body, or posture, allows the voice to work optimally. Though different recipes to proper alignment for singing exist, the
most important element to consider is the unique physiology of each singer. The singing teacher must help each singer find the most organic alignment, reducing the body’s extraneous muscle tension, to prepare the body for success.

Respiration involves both the process of inhalation and exhalation and focuses on the function of the lungs and the muscles which affect the motion of the lungs. Often, students of singing believe that the more air one takes in the more successful the phrase. Because of this belief, the singer often sucks in breath, inhaling as though he intends to sing eight or ten bar phrases with every inhalation. As a blanket statement, this practice proves ineffective and simply exhausting. If one sings a short vocalize or short phrase in a song, he does not require a “full tank” of air. When the singer employs this method, the tone is often unclear (because of the excess air being pumped through the glottis, causing the tone to become distorted) and often the singer exhibits extra tension in their thorax, upper body and neck to compensate for all of the over-pressurized air building up below the glottis. So, the student must first master the inhalation issue before exhalation has a chance of being efficient and healthy. Ensuring that inhalation remains silent, coupled with a release of the muscles in the abdomen promotes healthy inhalation for adolescent singers. For efficient exhalation, maintaining expanded ribs in an attempt to delay the release of the diaphragm allows a more efficiently controlled exhalation.
Phonation, the process through which sound is produced, results from the glottis (vocal folds) being drawn together through a process called adduction. Efficient and healthy phonation involves a process during which breath and adduction must occur simultaneously, creating balanced onsets. Great ways to establish healthy coordination for phonation are onset exercises. Though balanced onsets remain the habitual goal, in certain styles of singing (like musical theater and contemporary commercial musical styles) and for certain languages (like German and English), the glottal or hard onset is often employed.

The “intensification and enriching of a musical tone by supplementary vibration,” resonance, results in amplifications of a tone as well as changes in timbre of a tone. Singers can manipulate the resonance of a tone by changing the configuration of space within our resonance passageways, namely the mouth cavity and nasal cavities. Exercises useful in teaching adolescents about resonance are the use of nasal consonants like [ŋ] in exercises like a descending five-note scale on [mŋ]. Another resonance exercise, straw phonation, consists of singing (buzzing) a melody through a straw. This helps not only with resonance but also with efficiency of exhalation.

Style relates to the genre from which the song originates. Style can retroactively affect other technical building blocks of singing. For example, the genre of musical theater requires a different resonance than classical or folk genres, marking resonance as perhaps one of the biggest differences between styles. Articulation and phonation

147 McCoy, “Your Voice,” 110.
can also be dependent on style. Musical theater, folk and commercial styles call for a more text and consonant-oriented articulation, whereas classical singing requires a more vowel-driven articulation. The demand of a carefully balanced phonation (onset) found in classical singing, differs from other styles which often incorporate aspirate and glottal phonation.

The importance of the sequential nature of technique building cannot be overstated, specifically understanding that each building block be mastered before the others can be fully grasped. Instructors may teach other technical foundations to students while they are learning to master another. Still, the expectations the voice teacher puts upon the singer must be realistic. One cannot master every vocal technique at once. If taught sequentially, the singer will eventually master each of the above techniques and will grow into healthy and stable singer. For example, if a singer has tremendous jaw and tongue tension, how is he or she expected to have healthy and efficient phonation or resonance? Thus, the teacher must first provide the student with tools to help relieve the tension before the teacher can reasonably expect the student to tackle efficiently the other technical building blocks. It is important to note here that the teacher must be conscientious of the needs of the student. Thus, the aforementioned building block sequence may need to be manipulated to fit the needs of the individual.

The formula used for adolescent students slightly differs from the above and is derived from my own experiences as well as teachers of adolescents including: Kenneth
Phillips, John Cooksey, Lynne Gackle. The elements of teaching the adolescent voice are:


Blocks one thru four mirror the foundations for adult students. For adolescents, phonation and resonance must be treated more delicately because of the state of change experienced by adolescents. Phillips states that “Instruction in singing challenges students to grow in knowledge, to explore their feelings, and to learn expressive means of communicating thoughts and emotion.”

His statement rings true for any singer or artist, but especially for those who are in their own process of self-discovery. Learning to express oneself through interpretation of song may be a window of communication with the world in general and the people within it. Thus, teachers would be well advised to stress the communicative aspect of singing when working with adolescent singers.

Diction is essential to the communication of songs to an audience. These two elements are a bit more innate for adults, but less so in adolescents. Diction involves not only the articulation of vowels but also consonants. Tongue twister exercises like “red leather, yellow leather” on an ascending and descending triad, or “double bubble, double bubble gum” on a descending five-note scale can help to activate the consonant articulators, namely the tongue, teeth and lips. One accomplishes vowel articulation through tongue work, like the alternation of vowels like [u-i] on a descending five-note scale.

\(^{149}\) Phillips, “Teaching Kids to Sing,” 106.
scale or the classic [mi-me-ma-mo-mu] on the same pitch. During vowel articulation, the
teacher should discuss how one forms different vowels, to allow the singers to become
more aware of the physical attributes of different vowels. This will not only aid in clarity
of text but also with resonance.

When teaching expression in singing, I classify it into three categories: musical
expression, textual expression, and artistic expression. The actual musical score provides
the basis for musical expression (e.g. tempi, dynamics, phrase markings, accent
markings, etc.). This kind of expression affords an opportunity for the teacher to help
the student decipher a score and become better acquainted with the terminology and
markings in a score. Textural expression deals with the examination of the poetry of the
piece in order to understand it as a literary work. This process involves the student
understanding the meaning of every word, and also examining metaphors and other
literary devices to find deeper meaning within the text. This process would be a great
assignment to give a student as homework since all adolescents now have access to the
internet, but teachers will likely need to aid them in deciphering some of the
metaphors, imagery, etc. when needed.

The element of artistic expression makes one singer’s interpretation of a song
unique from another’s. Artistic expression as vocal experimentation helps the singer to
find the most beautiful and organic interpretation of each piece. This can be
accomplished by the manner in which the singer emphasizes certain words or notes in
phrases or by the vocal colors the singer chooses to use throughout a song. Possibilities
are endless with how to use artistic expression in the student’s interpretation, but should be a joint effort between the teacher and the student. The teacher must create a healthy, safe environment for the singer, so he or she feels at liberty to experiment and try new things and explore the possibilities of his or her voice.

Keeping consistency in teaching and also transparency with technical goals gives the student a healthy technical foundation. The aforementioned chronologically based building blocks can relate to one another. Thus, when one building block seems mastered, issues can quickly arise when moving on to another concept, so the teacher must always be on the lookout for any possible technical faults. Appendix E provides a quick reference of adolescent technique for music educators to have on hand as well as exercises to promote the development of the aforementioned building blocks.

**PHYSIOLOGY**

A teacher of the adolescent voice must possess a keen awareness of basic vocal physiology as well as the changing vocal physiology of the mutational voice. All the systems of the body have the potential to affect the vocal instrument, but I will focus largely on the larynx, respiratory system, hearing, thoracic muscular system as well as areas of the head and neck which affect the voice.

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150 The images used in this chapter are from the 1918 edition of *Gray’s Anatomy*, which is now in public domain.
Larynx

The larynx is composed of four primary cartilages and numerous muscles. The epiglottis acts as a protective flap, which covers the glottis to protect the airway during swallowing. The thyroid cartilage forms the front of the larynx and acts as a shield for the front of the glottis. The cricoid sits below the thyroid, in the shape of a signet ring, and it is larger in the back than in the front (posteriorly vs. anteriorly). The arytenoids are a pair of cartilages located superior to the cricoid and posteriorly to the vocal folds. During adolescence, the cartilages of the larynx are more soft and flexible and become harder into early adulthood and harder still and bone-like into late adulthood.

For the students to gain a better understanding of the cartilages of the larynx and how they connect, in Appendix F, you will find a template and directions for your students to build their own larynx.
The muscle groups integral to the singing voice are highlighted here, beginning with the intrinsic laryngeal muscles and their function, followed by an overview of some of the extrinsic laryngeal muscles which can affect singing. All of the intrinsic muscles of the larynx function as a pair, with one of the pair labeled on Fig. 7.2. As with all other muscles of the body, the origin and insertion points name the muscles of the larynx. The muscle pair responsible for opening or adducting the glottis is the posterior cricoarytenoids (labeled A in Fig. 7.2) which connect the cricoid and arytenoid cartilages. The muscles responsible for bringing the vocal folds together (adduction) are the lateral cricoarytenoids, which close the posterior section of the glottis as well as the interarytenoid muscles, which close the remaining portion of the glottis (labeled B & D). The function of the thyroarytenoid muscle pair is to shorten and thicken the vocal folds (labeled C). Thus, the vocal register most closely associated with the muscle pair is the chest voice (or modal voice). The muscle pair

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151 McCoy, 111.
152 Ibid, 110.
most associated with head voice is the cricothyroid. When this pair contracts, the vocal folds become more elongated and thinner (Labeled A on Fig. 7.3).\textsuperscript{153}

Extrinsic Laryngeal Muscles can have a huge effect on the product of singing. Some of these muscles which often have a negative effect on the singing are the constrictor muscles. They wrap around the entire vocal tract. When they contract, they narrow the pharynx and elevate the larynx.\textsuperscript{154} For an adult larynx, contraction of these muscles can cause a plethora of issues in the voice including: problems in resonance, breath management, etc. The adolescent voice can often mask these issues, due mostly to the lack of ossification of the cartilages, but they will become problematic as the voice matures. Into adulthood, cartilages in the body begin to harden, or ossify, reducing flexibility of the cartilages, while also adding stability to the bodily structures.\textsuperscript{155} In adolescents, the lack of ossification can be both helpful and harmful. On one hand, the flexibility will allow the larynx to elevate extremely high and tilt, resulting in the singer maintaining chest voice,\textsuperscript{153}

\textsuperscript{153}Ibid.
\textsuperscript{154}Ibid, 117.
\textsuperscript{155}Ibid.
or modal voice much higher than what would be acceptable or possible in adult singing. On the other hand, this flexibility could keep the singer from developing head voice and balanced registration. As the cartilages start to harden into young adulthood, if the singer maintains the same expectations of his or her voice, she will be disappointed with the voice’s function. Compensatory tensions are also likely to arise from the student attempting to maintain the adolescent vocal function. This vocal habit is a difficult one to break and one that can lead to long-term tension problems. Thus, the adolescent singer must begin to develop coordination of all the intrinsic muscle groups, so that as the voice matures it will mature on a healthy path.

**Respiration**

Respiration involves two elements: inhalation and expiration. Though the lungs are the organ responsible for respiration, the thoracic muscles are responsible for the mechanics of respiration. First discussed are the muscles responsible for inhalation, followed by the muscles for involved in expiration.

The most important muscle for inhalation is the diaphragm. There are several misconceptions about the diaphragm. First, the diaphragm is not located in the lower abdomen; it connects to the sternum, ribs seven through twelve.

![Diaphragm](Image)
and to the costal cartilages.\textsuperscript{156} Second, one cannot “breathe from the diaphragm” because it remains a muscle over which most people have little to no direct control.

When the diaphragm contracts, it lowers slightly and becomes slightly flatter, causing a vacuum-effect which pulls the outside air into the lungs.\textsuperscript{157} Located between each rib, the external intercostals are another important muscle group for inhalation (labeled A in Fig. 7-5). As they contract, they pull the ribs upward and outward, creating a larger cavity for lung expansion.\textsuperscript{158} These muscles are voluntary and singers can increase thoracic capacity by becoming intentional in their efforts to expand the circumference of the thorax.\textsuperscript{159}

The process of expiration is one of particular importance to singers, as mastering this process leads a singer to sustain long and beautiful phrases without apparent difficulty. Singers must attempt to delay the retraction of the diaphragm and constriction of internal intercostals for as long as possible. During contraction of internal intercostals (labeled B), the ribs are pulled down and inward.\textsuperscript{160} Additional muscles in

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{thoracic_muscles.png}
\caption{Thoracic Muscles}
\end{figure}

\begin{itemize}
\item \textsuperscript{156} McCoy, 83.
\item \textsuperscript{157} Ibid, 84.
\item \textsuperscript{158} Ibid, 85.
\item \textsuperscript{159} Ibid.
\item \textsuperscript{160} Ibid, 86.
\end{itemize}
the thorax and abdomen which contribute to breath management for singers include:
external oblique, internal oblique, transverse abdominis (labeled C) and rectus
abdominis (labeled D). Upon contraction, these muscles contribute to expiration by
either depressing the thorax or by compressing the viscera upward toward the
diaphragm.\footnote{Ibid.} If the singer learns to manage the muscles of expiration, he will gain
better breath control and be able to make better artistic choices in his delivery of
phrases.

**Hearing**

Hearing is immensely important to the singing instrument. The ears, though not
directly attached to the larynx, are integral to successful singing. The auditory feedback
loop is especially important in singing; the process during which the brain and ears
monitor vocal sounds to check for accuracy. If discrepancies arise, the aural loop
corrects the issues swiftly and subconsciously.\footnote{McCoy, 171.} Teachers of singing must kindle the
development and sensitivity of this phenomenon not only because of its positive effect
on pitch accuracy, but also because of its contribution to tuning and timbre/resonance
adjustment. Tonal recall exercises help develop this skill; a practice during which the
teacher sings or plays a series of notes and the singer unaided accurately repeats those
notes. Sight singing exercises are also useful in aural loop sensitivity. Possibly as
important as the actual vocal source (vocal folds) concerning successful singing, the
singing ear requires attention and training for the singing instrument to thrive and reach
its potential. If singing teachers begin training the ear during adolescence using the above recommendations, or other ear training strategies, it is reasonable to deduce that pitch accuracy, tuning and resonance will be positively affected into adulthood.

**Resonators of the Vocal Tract**

Resonators of the vocal tract are essentially hollow spaces above the vocal source (vocal folds) which act as a resonance filters for soundwaves passing through.\(^1\) Thus, the primary resonators of the vocal tract are the pharynx (labeled A on Fig. 7-7), the oral cavity (labeled B) and the nasal cavity (labeled C). These resonators are the means for which sound can become molded into beautiful tones, vowels, timbres, and everything a singer needs to be understood and to communicate with her audience. Teaching adolescents about different shapes of vowels can be an effective strategy in showing students the possible effects of resonators. For example, the tongue arches forward for the [i] vowel, whereas the [a] vowel is characterized by the tongue resting in a lower and further back

\(^1\) Ibid, 28.
in the mouth position. Singers can also experiment with nasal resonance by alternating
nasal sounds with non-nasal sounds, like [ŋ-a-ŋ-a-ŋ-a]. Regardless of which particular
resonance exercises used, it is important to begin to teach their students about
resonance as early in their vocal development as possible.

The physiology discussed in this chapter is by no means exhaustive of all the
systems involved in singing, but strives to highlight some of the important systems
and mechanics of the vocal mechanism.
CHAPTER 7:
ADOLESCENT SOLO REPERTOIRE SUGGESTIONS

In choosing appropriate repertoire for adolescents, several factors merit consideration. First, the teacher must ensure the appropriateness of the text for each singer. For example, the mature text of “Unchained Melody” poses a serious problem of believability when sung by a ten-year-old. Second, the range and tessituras must lie in the appropriate pitch range for the singer. If the repertoire lies too far out of the singer’s tessitura, he/she will likely develop some unhealthy vocal habits as a result. Third, the technical demands of the piece must prove realistic for the student. For example, a girl in the midst of her voice change and experiencing breathiness due to the vocal chink should not receive repertoire with extensive sostenuto demands. Ultimately, when choosing repertoire the instructor must know and empathize with the strengths and weaknesses of each student in order to make appropriate repertoire choice on the singer’s behalf.

Though choosing appropriate repertoire for adolescents may be one of the more difficult aspects of teaching this population, informed choices are possible. The instructor must keep in mind the constant state of vocal flux experienced by adolescents. Not only are these voices constantly changing, resulting in different ranges,
tessituras, technical demands and limitations, but one must reflect on other aspects in selecting repertoire. Teachers of other instruments do not have to take into consideration appropriateness of text or emotional maturity of subject matter, per say. Teachers of instrumentalists generally choose repertoire that achieves a specific technical goal. Teachers of singers must constantly ensure appropriateness of text for the singer in addition to other considerations including: range, tessitura, and technical demands. Appendix G provides teachers guidelines to help make informed and considerate decisions in assigning repertoire. Though Brittney Spears was technically an adolescent when she recorded “Hit me baby, one more time,” the song lacks suitability for any adolescent. On the other hand, when Christina Aguilera, as an adolescent, sang “Reflection” from Disney’s *Mulan*, the text reads as extremely appropriate for any adolescent girl. While it may be impressive for a boy soprano to sing the “Queen of the Night’s aria,” its text, technical demands and call for emotional maturity exemplifies a developmentally inappropriate repertoire choice for a pre-pubescent boy soprano.

A wonderful advocate for repertoire for children and adolescents is Robert Edwin. In his *Journal of Singing* articles, he not only discusses CCM (Contemporary Commercial Music) pedagogy for adolescents, but also provides suggestions of appropriate repertoire.¹⁶⁴ Other great assets to publications of adolescent solo repertoire are Joan Frey Boytim’s extensive list of song anthologies. She edited and/or compiled many collections for the young singer. Also, Richard Walter’s editions of songs

for young voices continue to help fill the need of suitable repertoire for the adolescent population. An interesting anthology titled *Tales of Land and Sea: Solo Songs for the Male Changing Voice* by Mark Patterson, compiled specifically for the male changing voice, follows the voice chronologically through the male voice change.\(^{165}\) Though 20-30 years ago relatively little solo repertoire was published for the child and adolescent voice, this need is finally starting to be met by the above figures and more as awareness of this need spreads. A list of music books appropriate for this population is included in Appendix H.

The following provides a sampling of solo repertoire for both the adolescent boy and girl voice. Repertoire from multiple genres is highlighted with a rationale for each piece, including technical demands, developmental concerns and relevancy for the adolescent singer. Regarding stages of development, the choice to focus on the later mutational stages for both males and females is intentional. Cooksey’s male stages III-V, and Gackle’s female stages IIB and III will serve as basic guidelines for range, tessitura, etc. in repertoire choices. The aforementioned stages occur when much of the physical changes of puberty have occurred (e.g. post-menarcheal girls) and when poor vocal habits likely begin to manifest.\(^{166}\)


**ADOLESCENT BOYS**

**Stage III: High Mutation: Midvoice I, Adolescent Boy**

- Cooksey’s Guidelines: Range- F3-B4/C5, Tessitura- A3-G4
  Characteristics- Loss of agility, vocal coordination issues appear, maximum power of sound A3-G4

- Song Choice: Folk Song “Oh! Susanna” Stephen Foster
  Range: G3-E4
  Tessitura: B3-E4

  This piece exemplifies the humorous text and storytelling process of delivery that are characteristic of Foster’s songs. Regarding its technical demands, it highlights the voice’s “power zone” between A3 and G4 where a surprising degree of volume can be achieved. This song also requires much energy from the performer (something for which adolescent boys seem to have an endless supply). The syllabic and patter style does not require large amounts of vocal stamina or agility, thus it meets the above characteristics for a Stage III boy. Students need not sing all verses, thereby reducing the need for extended vocal endurance.

- Song Choice: “Be Our Guest” from Disney’s *Beauty and the Beast*
  Range: D3-B4
  Tessitura: B3-G4

  Many Disney songs are not only well-known to adolescents but their demands also tend to mirror the capabilities of young and developing voices. The songs written by Alan Menken for Disney tend to be particularly suitable for young singers. They often present a limited range, present adolescent-appropriate texts and often present attainable technical demands for adolescent voices. However, some Disney songs are...
not appropriate for adolescent singers; thus, educators are advised to carefully evaluate all repertoire options. For example, those who believe “Let it Go” from *Frozen* should be sung by adolescents do not consider the extreme technical demands and stamina required for some of the most contemporary Disney songs. "Be Our Guest” requires high energy, and includes both sung and spoken portions. Characteristics like these allow for some flexibility regarding range. If the range extends too high for the student, he has the option of incorporating speech for the higher bits and the song would remain stylistically appropriate.

**Stage IIIA: High Mutation: Midvoice II, Adolescent Boy**

- Cooksey’s Guidelines: Range-D3-F/G4, Tessitura-F3-D4
  Characteristics- Baritone quality begins to emerge

- Song Choice: Art Song “Farewell” Robert Franz
  Range: F3-E4
  Tessitura: G3-D4

  Many of Franz’s art songs are appropriate for young and developing voices, so there is little surprise that many of his songs are included in anthologies for beginning voices or young voices. They captivate audiences and singers of all ages and skill levels find them interesting to perform. His songs usually have a range of around an octave, are quite compact (usually not more than a couple pages) and are not generally melodically or harmonically complex, making them appropriate for the changing voice. From an aesthetic perspective, the ominous mood of “Farewell” would likely appeal to the adolescent boy. Some musical and technical challenges in this piece include some
complex rhythms, specific articulations, some chromaticism, as well as several instances of *messa di voce*. Thus, application of musical articulation and dynamic control are the main goals of this piece.

- **Song Choice:** “Luck Be a Lady” from Guys and Dolls by Loesser
  - Range: C3-D4
  - Tessitura: F3-C4

  “Luck be a Lady” provides a representative example to the beloved musical *Guys and Dolls*. The verse of this song presents rhythmical challenges and quite a bit of chromaticism, which could be a concern for young singers who do not have strong musical backgrounds. If the teacher determines the verse may be problematic for his singer, I would recommend the singer beginning at the chorus of the song. The chorus also presents challenges, such as sustained low notes, which may be a stretch for some of the newly lowered voices.

**Stage IV: Postmutational Period: New Baritone, Adolescent Boy**

- **Cooksey’s Guidelines:** Range- B2/C3-D4, Tessitura- D3-A3
  - Characteristics- Husky quality, Vocal lift around C/D4 with difficulty singing beyond lift, Agility is limited, Limited dynamic capabilities

- **Song Choice:** Spiritual “Nobody Knows de Trouble I’ve Seen” Harry T. Burleigh
  - Range: C3- C4
  - Tessitura: C3-A3

  Spirituals, when arranged traditionally, are great options for young singers and even for some changing voices. This spiritual’s range not only lies between Cooksey’s
guidelines but also the tessitura is an almost exact match to the guidelines. The husky
voice quality that many young men in Stage IV experience would take nothing away
from the genre, rather it would likely enhance the character of the piece. The melodic
line does have a wide leap down, repeating multiple times throughout the piece. This
leap could be a tool in connecting more fully with the modal voice and bringing more
strength into that register. This song would present a dialect challenge for the singer,
but easily mastered with coaching. It also presents an opportunity to connect music
with social issues, by educating the singer (or perhaps assigning homework about) the
cultural context during which spirituals were written.

- **Song Choice: “Les Poissons” from Disney’s The Little Mermaid**
  - Range: B2-A3
  - Tessitura: C3-G3

  Disney offers another song for the adolescent voice. This one presents several
technical and textual demands. The range of this piece employs much more of the
modal range than others and includes some vocal skips, which can be difficult for stage
IV boys. Music educators are encouraged to include some arpeggiated chords in warm-
ups to prepare the student for working on this piece. The character singing this song,
Frenchman Chef Louis, needs to have a heavy French accent. The French text and accent
may prove challenging for a young singer, yet learning the proper pronunciation and
translation of the text add more opportunities of education for young voices.
Stage V: Early Adult Phase, Adolescent Boy

- Cooksey's Guidelines: Range- A2/C3-E4, Tessitura- C3-B3
  Characteristics- Adult characteristics begin to emerge, Agility, Resonance, and Dynamic power increase significantly

- Song Choice: Art Song “Who is Sylvia?” Franz Schubert
  Range: C3-D4
  Tessitura: F3-C4

  This review offers another beautiful German piece, this time by Schubert. Again, I would encourage the adolescent to sing this in the English translation. Aside from being a lengthy yet beautiful piece, this song too attempts to build resonance in the modal voice, via a top-down approach. It also requires a beautiful legato line and re-introduces some agility into the voice. Several places with large leaps require increased vocal coordination, which should be possible for a Stage V boy. Though strophic, this piece requires increased stamina, especially for some of the longer phrases. This piece would likely be easier to manage for the young tenor, yet a young baritone whose voice had not completely settled, and who still had consistent and freely produced C4 and D4 could also sing this piece.

- Song Choice: “The Pirate King” from The Pirates of Penzance by Gilbert & Sullivan
  Range: B2-D4
  Tessitura: E3-C4

  This fun piece incorporates the full range of a young man at mutational stage V. Some possible difficulties in this piece are instances of sustained notes in the top of the vocal range namely middle C. However, the brevity of the piece reduces the likelihood of vocal fatigue. This song begins to connect the registers of the singer (e.g. chest voice,
mixed voice and head voice) without causing high strain on the instrument. “The Pirate King” also provides a multitude of dramatic possibilities. If performed, a costume including a sword would be appropriate, or a small chorus could be involved (as the piece was originally written to include choral responses). What young male singer, after having recently experienced the instability of a voice change, would refuse the empowerment of portraying a pirate king, with a band of pirates supporting him?

ADOLESCENT GIRLS

Stage IIB: Puberty/Post-Menarcheal Adolescent Girl

- Gackle’s Guidelines: Range- A3-F5, Tessitura- B3-C5
  Qualities/Considerations: Tessituras can move up or down or narrow, resulting in a limited comfortable range, 2 register breaks, G4-B4 & D5-F#5, Consider moving singer to Sop II or Alto during this time, Continue to vocalize throughout the range.

- Song Choice: Art Song “I dreamt my love was singing” by Liza Lehmann
  Range: C4-Eb5
  Tessitura: G4-C5

  The textural treat of Liza Lehmann’s songs generally employ much wit and many are quite appropriate for the young voice (e.g. “If No One Ever Marries Me,” Bird Songs, Nonsense Songs, etc.). From the song cycle Breton Folk-Songs, the more serious tone of “I dreamt my love was singing” differs from some of her other songs, but remains appropriate for an adolescent singer. While being within the acceptable vocal range and tessitura, this song presents some rhythmic and harmonic challenges, as well as some
dynamic nuances that may be difficult for an unstable voice to master. This piece also offers an array of articulations, which can add to the singer’s musical vocabulary.

- **Song Choice: “Castle on a Cloud” from Les Miserables**
  - **Range:** A3-C5
  - **Tessitura:** C4-A4

  “Castle on a Cloud” fits, almost perfectly, the characteristics and qualities of the newly post-menarcheal girl. This piece would be most appropriate for a girl who presents alto or mezzo-soprano characteristics, as it has some sustained lower notes. This rather serious piece must be sung by one emotionally mature enough to interpret the text in a believable way. The role of “Young Cosette,” often performed by a girl in the age range of 9-12, represents the exact period during which many young ladies are experiencing Stage IIB of their vocal mutation.

- **Song Choice: “Candle on the Water” from Pete’s Dragon**
  - **Range:** A3-C5
  - **Tessitura:** E4-A4

  This song from Pete’s Dragon would be acceptable for a young lady in any of her stages of voice mutation. It could even be a great piece for an adolescent boy in Stage III, Midvoice I of mutation. “Candle on the Water” presents a limited range and is built on 2-bar phrases. The sustained tones at the ends of phrases should be manageable for these singers. An important vocal technique to maintain throughout voice mutation is legato, a requirement of this piece. This song however, would probably not be
appropriate for an older adolescent because of the more mature singer’s emotional
desire for more textual complexity.

**Stage III: Young Adult Female/Post-Menarcheal**

- Gackle’s Guidelines: Range- G/A3-A/B5, Tessitura- A3-G5
  Qualities/Characteristics- Large range, Breathiness Decreases, Volume,
  resonance and agility increase, Richer tone, Increased vocal consistency, D5-F#5
  break still apparent.

- Song Choice: Art Song “Nel cor più non mi sento” G. Paisiello
  Range: E4-F5
  Tessitura: F4-C5
  The comfortable range and compositional characteristics of “Nel cor” work to
  rebuild some of the techniques that may have proven overly-challenging in the previous
  stages of development. A technical challenge, agility work can be found in this selection.
  While not full of melismas like some Handel or Purcell, it works to rebuild the
  coordination required for the technique of agility. The few instances of sostenuto help
  the singer strengthen vocal coordination as well. The text is in Italian, can challenge a
  young singer, especially when the text needs strong characterization to tell a believable
  story. However, the cute and perhaps over-stereotyped subject matter of teasing and
  pouting could prove fun for an adolescent girl to portray.

- Song Choice: “Goodnight, My Someone” from *The Music Man*
  Range: B3-E5
  Tessitura: F4-C5

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From one of the most respected musicals of all time, “Goodnight, My Someone” offers a great sampling of this musical. One would find it best suits a young soprano because of range and tessitura. It also presents some difficult challenges regarding sustained singing, as it calls for some of the longest phrases in this repertoire review. These challenges will force the singer to re-build breath management and vocal efficiency though the longer phrases. Several times throughout the course of the song, the singer must sustain a high E5, presenting some sostenuto challenges in the upper passaggio area. This will require the singer to coordinate resonance with breath and muscular strength to ensure healthy tone. Proper navigation throughout their registers presents another challenge, compelling the singer to work toward an even tone from top to bottom of their range.

- Song Choice: “Reflection” from Disney’s *Mulan*
  Range: G3-Eb5
  Tessitura: C4-Bb4

Perhaps one of the most well-known of the pieces presented in this review, “Reflection” remains a favorite of adolescent females. The age-appropriate text of this piece reads extremely relevant to any adolescent girl, in that it delves into struggles of self-discovery and acceptance of one’s self. It does present some significant technical demands that could prove challenging. The wide range of “Reflection” would probably be best suited for a young mezzo-soprano, as the chest voice must be clear and resonant. It also demands that the singer efficiently navigates into their upper passaggio with ease; yet another piece to help unify the vocal registers.
The above options are merely samplings of solo options for changing voices, and an attempt was made to provide choices from different genres in order to appeal to different tastes of both singers and teachers. Though these are suggestions of repertoire for students in particular stages of mutation, the responsibility of assigning repertoire empathetically for students falls on the shoulders of the instructor. An individual singer may not present the exact characteristics or qualities for the stage of mutation in which you believe your student to be. So, you must give your student repertoire which fits his or her particular needs. The song choices should be an opportunity to improve their current technique while still being a realistic possibility for the individual. Also, if the student’s voice moves to a different stage of mutation while working on a particular piece of music, do not be afraid to scrap that piece and start with something new. If the instructor insists on a particular piece, even when aware of the changing needs of the student, a disservice has occurred. Though time consuming choosing appropriate repertoire for this population may be, it remains one of the most important tasks of the music educator.
SUGGESTIONS FOR FUTURE RESEARCH

This document has synthesized the current research on vocal health, hygiene, voice disorders and prevention. However, holes still exist which could be filled within this area of research. The most significant relate to the vocal disorders/pathology and prevention of said disorders. Some of these strains of inquiry could include cross-sectional studies of vocal instructors of adolescent singers as well as the adolescent singers. A cross-sectional study of vocal instructors could involve a comparison between perceptions of choral directors versus private voice instructors in their experiences with adolescent singers in regard to vocal health, hygiene and prevention. It would be useful to examine how vocal music instructors of adolescent singers deliver and implement vocal health and hygiene strategies with their students, and the efficacy of the instructor’s strategies. A longitudinal study of examining the efficacy of vocal health and hygiene strategies with adolescent singers over a span of time would also prove helpful in validating certain vocal health and hygiene strategies. A study comparing strategies in different regions or even countries to synthesize vocal health strategies would be a worthwhile contribution to the field.
Some of the most interesting research for adolescents, especially in the 21\textsuperscript{st} century would be to examine the adolescents directly. A cross-sectional study of vocal habits and hygiene would give the researcher perspectives on voice use, vocal influences, and habits that could influence the vocal health of an individual. A longitudinal study on adolescents would be the most difficult, but also the most informative. If adolescent singers were followed for a period of time (e.g. a school year), would certain vocal hygiene strategies make them less susceptible to vocal injury or disorder? This would give vocal music educators better insight as to which strategies are going to work for the 21\textsuperscript{st} century adolescent singer.

Technology can play a large role in new resources for music educators with regard to teaching adolescent singers. Since selecting appropriate repertoire can be a challenge, a resource which leads music educators to suitable songs for individual singers. A searchable database which provides song options from a variety of genres would be an amazing tool for working with changing voices. It would be searchable by several parameters including: gender, genre, range and tessitura.

The aforementioned suggestions are just a sampling of further investigations which could be pursued in this vein of research. Since little research regarding the health of the adolescent singing voice and voice disorder prevention with this population exists, even the most minimal contribution could likely be exponentially beneficial.
CONCLUSION

The resilient and impressionable adolescent singing voice experiences an almost constant state of flux. When left to one’s own devices, the adolescent singer will likely emulate their favorite pop star, or other vocal model and will copy other singer’s vocal habits. Rather, the young singer should work to build the technical tools to develop his or her own unique voice. Thus, enters the vocal music educator.

Music educators must proceed with great caution and understanding when working with the adolescent singing voice. These teachers are responsible for building a foundation of vocal technique and hygiene in young voices. If teachers insist on healthy hygiene habits, help their students learn about and become self-aware of their instruments, provide students with proper repertoire and also know how to proceed if their student shows indicators of vocal injury, the vocal foundation for that student will likely become strong, healthy and reliable.

Music educators can guide their students to a healthy vocal foundation through awareness, knowledge and persistence. The teacher must be aware of the overall vocal challenges that today’s adolescent singer faces, both physically and socially, and must be aware of the specific challenges that his/her students encounter. Voice educators must understand the successful time-tested pedagogical techniques for this population.
(like that of Cooksey, Swanson, and Gackle) yet must be open to adjusting pedagogical ideas as the needs of their students’ change.

The elements included in a particular teacher’s pedagogy must be appropriate for the population whilst being consistently and persistently delivered. In order for the technical ideas to be appropriate for each young singer, the teacher must appreciate the singer’s strengths and weaknesses. Building agility and range extension, for instance, are not particularly useful for a young boy in the crux of his voice mutation when he is experiencing heightened vocal instability and has a narrow reliable range. Likewise, an adolescent girl with indications of a vocal chink will likely be unsuccessful and become frustrated with extended periods of sostenuto singing. In order for habits or techniques to form within a singer, the teacher must persistently expose the student to the desired outcome. The role of the adolescent vocal music educator is challenging yet crucial to the lifelong foundation of a singer’s vocal health, hygiene and technique.

Much research is yet to be accomplished regarding the adolescent singing voice in the 21st century, though this document attempts to encourage discussion amongst vocal music educators regarding the vocal health, hygiene and pedagogy of this impressionable population.
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APPENDIX A: DEFINITION OF TERMS
Adolescence - for the sake of this document will be defined as a heightened period of development of young people aged approximately 12-16.

Amplitude - the quantitative measure of strength of a signal, the decibel (unit used for measuring relative sound pressure level) amount of sound.\textsuperscript{167}

Breath Management - “control of the inspiratory/expiratory components of the breath cycle, efficiently uniting myoelastic and aerodynamic aspects of phonation.”\textsuperscript{168}

Chest Voice/Mode 1/Modal Voice - thickened vocal folds by contraction of the thyroarytenoid muscles, resulting in a significant vertical phase difference during vibration.\textsuperscript{169}

Dysphonic - when the voice changes from normal to disordered.\textsuperscript{170}

Falsetto - male vocal register which uses mode 2 musculature, but for which the glottis may not fully close.\textsuperscript{171}

Head Voice/Mode 2 - elongated and thinned vocal folds by contraction of the cricothyroid muscles, with minimal vertical phase difference and with mucosal movement most focused along the medial margins of the vocal folds.\textsuperscript{172}

Legato - connected, sung in a smooth, unbroken manner.\textsuperscript{173}

Melisma - more than one pitch sung to a syllable.\textsuperscript{174}

Mucosal Wave - complex vibratory and oscillatory movement of the mucosal layer of the vocal folds, which leads to phonation.\textsuperscript{175}

\textsuperscript{171} McCoy, 145.
\textsuperscript{172} Ibid.
\textsuperscript{174} Ibid, 311.
**Onset** - initiation of vocal sound through coordination of breath and muscle constriction within the larynx.\(^{176}\)

**Passaggio** - a vocal register pivot point including the primo passaggio (transition between chest voice and mixed voice registers) and secondo passaggio (transition between mixed voice and head voice registers).\(^{177}\)

**Range** - the highest and lowest pitches of one’s voice or of a piece of music.

**Register** - a series of consecutive pitches/tones possessing similar timbre which differ from another series of tones.\(^{178}\)

**Resonance** - the resounding of upper harmonics over the fundamental.\(^{179}\)

**Sostenuto** - sustained, prolonged, held.\(^{180}\)

**Tessitura** - a subset of range, usually referring to a series of consecutive pitches in a piece of music. It helps to determine if a particular piece is suitable for a particular singer.

**Timbre** - unique tone color.

**Vocology** - study of the voice. A vocologist is one who specializes in voice, including voice disorders and their management.\(^{181}\)


\(^{177}\) Ibid, 312.

\(^{178}\) Ibid.

\(^{179}\) Solnimsky, 435.

\(^{180}\) Ibid, 498.

APPENDIX: B ADOLESCENT VOCAL HEALTH AND HYGIENE QUIZ
## Vocal Health Quiz

**Discover if you are in the Vocal Danger Zone!**

Just Skating By or are a Vocal Health Superstar!

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I drink how many glasses of H2O/day?</td>
<td>a. 2-4</td>
</tr>
<tr>
<td></td>
<td>b. 4-6</td>
</tr>
<tr>
<td></td>
<td>c. 6-8</td>
</tr>
<tr>
<td>2. How many hours of sleep a night?</td>
<td>a. 3-5</td>
</tr>
<tr>
<td></td>
<td>b. 5-7</td>
</tr>
<tr>
<td></td>
<td>c. 7-9</td>
</tr>
<tr>
<td>3. How much do I warm up your voice?</td>
<td>a. @20 min</td>
</tr>
<tr>
<td></td>
<td>b. I don’t</td>
</tr>
<tr>
<td></td>
<td>c. @10 min</td>
</tr>
<tr>
<td>4. I find myself yelling over noise to be heard</td>
<td>a. sometimes</td>
</tr>
<tr>
<td></td>
<td>b. most times</td>
</tr>
<tr>
<td></td>
<td>c. hardly ever</td>
</tr>
<tr>
<td>5. I use my voice</td>
<td>a. 4- hours/day</td>
</tr>
<tr>
<td></td>
<td>b. 7+ hours/day</td>
</tr>
<tr>
<td></td>
<td>c. 5-6 hours/day</td>
</tr>
<tr>
<td>6. My voice gets tired</td>
<td>a. after 30 min</td>
</tr>
<tr>
<td></td>
<td>b. after a long day of singing</td>
</tr>
<tr>
<td></td>
<td>c. never</td>
</tr>
<tr>
<td>7. I eat spicy, fried foods or dairy</td>
<td>a. always</td>
</tr>
<tr>
<td></td>
<td>b. never</td>
</tr>
<tr>
<td></td>
<td>c. sometimes</td>
</tr>
<tr>
<td>8. I feel like I run out of breath when I speak</td>
<td>a. never</td>
</tr>
<tr>
<td></td>
<td>b. when I’m excited</td>
</tr>
<tr>
<td></td>
<td>c. always</td>
</tr>
<tr>
<td>9. I smoke or am around second-hand smoke</td>
<td>a. every day</td>
</tr>
<tr>
<td></td>
<td>b. never</td>
</tr>
<tr>
<td></td>
<td>c. only on occasion</td>
</tr>
<tr>
<td>10. When I go to concerts</td>
<td>a. try to get close</td>
</tr>
<tr>
<td></td>
<td>b. wear earplugs</td>
</tr>
<tr>
<td></td>
<td>c. sing along in the stands</td>
</tr>
<tr>
<td>11. After a football or basketball game</td>
<td>a. my voice is hoarse and tired</td>
</tr>
<tr>
<td></td>
<td>b. I have perfected my whistling and clapping skills</td>
</tr>
<tr>
<td></td>
<td>c. my voice is a bit tired, but okay</td>
</tr>
<tr>
<td>12. I use a humidifier</td>
<td>a. at night</td>
</tr>
<tr>
<td></td>
<td>b. never</td>
</tr>
<tr>
<td></td>
<td>c. only when I’m sick</td>
</tr>
<tr>
<td>13. If my voice feels bad I</td>
<td>a. let my teacher know</td>
</tr>
<tr>
<td></td>
<td>b. sing through it</td>
</tr>
<tr>
<td></td>
<td>c. go to the Dr.</td>
</tr>
<tr>
<td>14. If I am stressed out about something</td>
<td>a. make sure I release tension before I sing</td>
</tr>
<tr>
<td></td>
<td>b. sing through the stress</td>
</tr>
<tr>
<td></td>
<td>c. pretend it’s not there and worry about it later</td>
</tr>
<tr>
<td>15. If I feel tense I</td>
<td>a. stretch and use exercises to relax</td>
</tr>
<tr>
<td></td>
<td>b. think happy thoughts</td>
</tr>
<tr>
<td></td>
<td>c. yell at someone</td>
</tr>
</tbody>
</table>
Scores:
1) a. 1, b. 2, c. 3  
5) a. 3, b. 1, c. 2  
9) a. 1, b. 3, c. 2  
13.) a. 2, b. 1, c. 3
2) a. 1, b. 2, c. 3  
6) a. 1, b. 2, c. 3  
10) a. 1, b. 3, c. 2  
14) a. 3, b. 1, c. 2
3) a. 3, b. 1, c. 2  
7) a. 1, b. 3, c. 2  
11) a. 1, b. 3, c. 2  
15) a. 3, b. 2, c. 1
4) a. 2, b. 1, c. 3  
8) a. 3, b. 2, c. 1  
12) a. 3, b. 1, c. 2

If you scored 35-45 points you are a **Vocal Health Superstar!!!**
You are aware of your voice and what it takes to keep it healthy! You stay hydrated and make sure you don’t overuse your voice! Great Job! Keep up the good work!

If you scored 25-34 points you are **Just Skating By**
Increase your awareness of vocal use and hydration and you could quickly become a Superstar, too!

If you scored less than 25 points you are in the **Vocal Danger Zone!!!**
If you continue down this path, you could run into vocal injury or even a pathology. Now is the time to change your path!
Record Your Voice Use

<table>
<thead>
<tr>
<th>Activity Name</th>
<th>Amount of Time</th>
<th>Vocal Fatigue^{182} Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singing Rehearsals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singing Practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Voice Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talking on Phone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Athletic Events/Activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Did you consciously make time to rest your voice today?  Yes/No

How long did you rest your voice today? ______________________

Did you experience vocal fatigue today?  Yes/No  If yes, when? ___________

Did you feel that you had to raise your voice to be heard today?  Yes/No

How much water did you drink today? __________

Other hydrating liquids^{183} __________

How much caffeine did you drink today^{184} __________

^{182} Fatigue includes: Voice tiring, hoarseness, voice loss, effortful speaking or singing voice, etc.

^{183} Hydrating liquids include: Juices, milk, non-caffeinated teas, etc.

^{184} Caffeinated beverages include: Coffee, caffeinated teas, caffeinated colas, etc.
APPENDIX D: PARENT’S GUIDE FOR HEALTHY SINGERS
Parent’s Guide for their Singing Children

How can you as a parent help improve the quality of your child’s voice? By helping improve their vocal health and hygiene! The following are ways that you as parents can make a difference:

**Food**

- Limit the amounts of greasy and spicy foods, especially late at night
- Limit consumption of high amounts of dairy two hours before singing

**Hydration**

- Promote the consumption of hydrating liquids, rather than dehydrating liquids. The following are examples of the different types of hydrating and dehydrating liquids:

<table>
<thead>
<tr>
<th>Hydrating Liquids</th>
<th>Dehydrating Liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Colas with Caffeine</td>
</tr>
<tr>
<td>Juices</td>
<td>Coffee</td>
</tr>
<tr>
<td>Milk</td>
<td>Energy Drinks</td>
</tr>
<tr>
<td>Decaf Teas</td>
<td>Black Teas</td>
</tr>
</tbody>
</table>

- Place a cool mist humidifier by your child’s bed at night to promote hydration during sleep.
- Encourage singer to keep a glass of water by bed at night so he or she can hydrate before and after sleep.
- Use of a topical nasal saline solution can keep the nasal cavity hydrated and reduce the likelihood of respiratory infection and/or shorten life of colds.

**Activities**

- Try not to overschedule your kid. Young voices are resilient, yet fragile and they need time to rest.
- Be aware of how your adolescent uses his or her voice during activities, especially in athletic activities like cheerleading, football, basketball, etc. They should not be screaming or using unsupported speaking voice.
- Provide your singers with alternative methods to making sound than screaming (e.g. noise-makers at sporting events and concerts)
- Encourage use of earplugs at loud events like concerts to preserve hearing.
Medications which Negatively Affect the Voice

- Antihistamines (e.g. Allegra, Claritin, Benadryl, Robitussin DM) can cause drying and if taken, extra water must consumed to counteract this effect.
- Analgestics (e.g. Aspirin, ibuprofen) can cause platelet dysfunction which could make the voice more susceptible to hemorrhage. Acetaminophen is recommended instead.
- Steroid Inhalers (e.g. Flovent, Beclovent) can develop inflammation from these types of inhalers. Aerosolized steroid can often cause vocal dysfunction and even deteriorating the vocalis muscle.

Signs of Vocal Danger

- Sudden loss of voice
- Persistent hoarseness
- Persistent Rough/gravelly voice
- Constant clearing of voice or coughing

What to Do if You Suspect Your Singer Could Be in Vocal Danger

- Encourage implementation of the above strategies to promote vocal health and hygiene.
- Look for patterns in vocal behaviors which could have led to vocal problem, and encourage them to use healthier habits. If you are unsure of how to promote healthier habits, refer them to their choir teacher, voice teacher or even set up an evaluation with a Speech-Language-Pathologist. (Most school districts have SLP’s available at no cost out of pocket.)
- Make an appointment with a local Laryngologist (an Ear-Nose-Throat doctor who has specialized training with the voice), so the MD can use stroboscopy to view the vocal folds to determine if there is a pathology present.
- A note about substance use and eating disorders: Adolescence is a time where kids start to experiment with substance use. The hope is that your child would be immune to their effects because they abstain from their use. However, parents are not always that lucky. Alcohol is severely dehydrating and it can also make the voice more susceptible to hemorrhage. Smoking of any substance dries out the protective mucosal layer on the vocal folds and the heat can cause swelling. Bulimia is especially destructive to the vocal folds because the gastric acid passing through the vocal folds can cause swelling and even lesions on the vocal folds. Prolonged and over-involvement of any of these activities could cause irreparable damage of the vocal instrument as well as to the individual.

APPENDIX E: FOUNDATIONS OF ADOLESCENT VOCAL TECHNIQUE
AND SUGGESTED EXERCISES
1. Relaxation
   - Stretch
   - Relaxing Breaths
   - Sirens
   - Semi-occlusion exercises (raspberries, tongue trills, lip bubbles)

2. Posture
   - Noble Posture
   - Knees slightly bent, one foot in front of other
   - Weight equally distributed on each foot

3. Respiration
   - Expansion around bottom of ribcage/back/abdomen
   - Breathe in, hiss out, increasing exhalation counts
   - Silent breaths
   - Breathe for the phrase (don’t over- or under-fill)

4. Phonation/Resonance
   - Onsets and releases
   - Use of nasal continuants to vowels (ex. /mi-me-ma-mo-mu/)
   - Legato from vowel to vowel

5. Agility (Be careful not to take these too high, especially for voices in the midst of mutation)
   - Use of triplet figures (not too high)
   - Arpeggios

6. Diction
   - Proper use of articulators in pronunciation of text
   - Use of tongue-twisters to gain control of articulators

7. Style/Expression
   - Proper techniques depending on style of song
   - They should always be telling a story- practice as a monologue

Always keep in mind your student’s stage of development and limitations: A healthy singer is a happy singer!
APPENDIX F: LARYNX MODEL TEMPLATE & INSTRUCTIONS
Build Your Own Tilting Larynx: 
Instructions

You will need: One paper template, Scissors, Glue, 4 small paper fasteners

Preparation

1. Cut around the thick outlines of the thyroid cartilage and the cricoid cartilage, the two arytenoids and the epiglottis.
2. Fold along the dotted lines
3. Make a small horizontal cut along the thick lines through the letters B and C on the cricoid cartilage.

Gluing Cricoid cartilage

4. Glue the cricoid cartilage to make a complete ‘ring’ (glue one A on top of the other). The letters should be on the outside of the ring.

Arytenoid cartilages

5. Glue the first arytenoid cartilage to form a three-sided pyramid (glue face D on top of the other face D). Leave the rectangular flap at the bottom free.
6. Repeat with the other arytenoids cartilage, gluing face E on top of the other face E.

Building the larynx with the paper fasteners

Arytenoid cartilages to Cricoid cartilage

7. Join the first arytenoid cartilage onto the cricoid cartilage, using a paper fastener. Line the F flap up on the outside of the cricoid ‘ring’, with the arytenoid pyramid overhanging inside. Then secure with a paper fastener, pushing through flap F on the arytenoids cartilage and point F on the cricoid cartilage, and opening the fastener up inside the ring to secure it.
8. Repeat with the second arytenoid and paper fastener, lining up the G flap with point G on the cricoid ‘ring’. Both pyramids should overhang inside the ring and above it.

Cricoid cartilage to Thyroid cartilage

9. Join the thyroid cartilage to the cricoid cartilage, using the remaining two paper fasteners. Line up point B on the thyroid cartilage to point B on the cricoid cartilage. The thyroid should be outside the cricoid ‘ring’ with the long arms pointing up above the arytenoids. Push the paper fastener through point B on the thyroid cartilage, and through the slot you cut earlier on point B of the cricoid ‘ring’. Open the fastener to secure it.
10. Repeat with point C on the thyroid cartilage, securing it with the paper fastener through the slot at point C on the cricoid ‘ring’. The thyroid cartilage should sit outside the cricoid ‘ring’, with the folded “notch” overhanging the joined narrow section of the ring.

Epiglottis to Thyroid cartilage (optional)

11. The narrow tip of the epiglottis glues onto the inside of the thyroid cartilage, approximately two thirds of the way down. The body of the epiglottis then sits up above the thyroid notch.

Teacher’s Checklist for Repertoire Assignments

**Boys: Based on John Cooksey’s Guidelines**

<table>
<thead>
<tr>
<th>Stage</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IIIA</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>A3-E5</td>
<td>A3-C5</td>
<td>G3-B4</td>
<td>D3-F4</td>
<td>C3-D4</td>
<td>A2/C3-E4</td>
</tr>
<tr>
<td>Tessitura</td>
<td>D4-C5</td>
<td>D4-B4</td>
<td>A3-G4</td>
<td>F3-D4</td>
<td>D3-A3</td>
<td>C3-B3</td>
</tr>
</tbody>
</table>

Characteristics: Stage I- Flexibility, Good Dynamic Variation, Soprano-Like Qualities  
Stage II- Increasing Difficulty above C5, Some Breathiness  
Stage III- Loss of Agility, Vocal Coordination Issues Appear, Maximum Volume A3-G4  
Stage IIIA- Baritone Qualities begin to Emerge  
Stage IV- Husky Quality, Vocal Lift C/D4 with Difficulty Singing above Lift, Agility Limited, Limited Dynamics  
Stage V- Adult Characteristics begin to Emerge, Agility, Resonance, and Dynamic Power Increase

**Girls: Based on Lynne Gackle’s Guidelines**

<table>
<thead>
<tr>
<th>Stage</th>
<th>I</th>
<th>IIA</th>
<th>IIB</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>Bb3-F/A5</td>
<td>A3-G/A5</td>
<td>A3-F5</td>
<td>G/A3-A/B5</td>
</tr>
<tr>
<td>Tessitura</td>
<td>D4-D5</td>
<td>D4-D5</td>
<td>B3-C5</td>
<td>A3-G5</td>
</tr>
</tbody>
</table>

Characteristics: Stage I- Light, Flute-Like, Soprano Timbre, Flexible  
Stage IIA- Breathiness, Register Break G4 & B4, Two Registers w/Obvious Flip, Sometimes Difficulty Producing Chest Voice, Volume Difficulties  
Stage IIB- Tessituras Can Vary, Limited Comfortable Range, Two Register Breaks G4-B4 & D5-F#5  
Stage III- Range Increases, Breathiness Decreases, Volume, Resonance and Agility Increase, Richer Tone, Increased Vocal Consistency, D5-F#5 Break Still Apparent

*Other Considerations: Text Appropriateness, Phrase Length, Dynamics Required, Melodic Contour*
APPENDIX H: REPERTOIRE FOR THE CHANGING & NEWLY CHANGED VOICE


______. *Easy Songs for the Beginning Mezzo-Soprano/Alto* (2 parts). G. Schirmer (HL.50483757) & (HL.50486243)

______. *Easy Songs for the Beginning Soprano* (2 parts). G. Schirmer (HL.50483756) & (HL.50486242).

______. *Easy Songs for the Beginning Tenor* (2 parts). G. Schirmer (HL.50483758) & (HL.50486244).

*Broadway Junior Songbook* (young men’s & young women’s editions). Hal Leonard (HL.470328) & (HL.740327)

Lerch, Louise, arr. *Broadway for Teens* (young men’s and young women’s editions). Hal Leonard (HL.402) & (HL.403)
