Finding Ophelia’s Voice

The Female Voice During Adolescence

by Lynne Gackle
A as a teacher and conductor, I have had a tremendous interest in the vocal development of adolescent girls for almost thirty years. Much of this interest resulted from an opportunity working with the Miami Girl Choir early in my career. In the late 1970s, I began to teach these students (ages 9–13) and realized that I had very little knowledge concerning this young voice. My expectations of the vocal capabilities of these young singers were limited and I possessed even less understanding of the vocal and physiological changes occurring during this time of intense growth and development.

In 1985, after presenting a demonstration workshop with my choir at the National MENC Biennial Conference in Chicago, I wrote an article concerning my experiences with these developing voices. I continued to have an interest in finding more effective ways to encourage healthy and efficient use of the changing female voice. Therefore, my doctoral dissertation focused upon the effects of specific vocal techniques on tone. Finally, I wrote a second article in 1991 which focused on the symptoms and characteristics of vocal change in the female voice based on empirical evidence and a synthesis of available interdisciplinary literature regarding young voices. These articles continue to be cited in various texts and in other studies concerning the female changing voice, underscoring the need for more information on this topic.

Often music educators, specifically those that work with adolescent singers, approach the teaching of these middle school/junior high-age singers with uncertainty, anxiety, and even a certain amount of fear. Many music educators and choral conductors are under-prepared for working effectively with the special needs of adolescent voices. In the past, the college/university education of vocal music educators and choral conductors has seldom prepared them to understand the nature, care, and cultivation of maturing adolescent voices. Many times, if information were presented, it was done so in an impractical setting without the benefit of actually hearing and working with young voices.

Fortunately, this trend appears to be changing and a greater emphasis is now being placed upon providing pre-intern and intern music educators with more information concerning the changing voice in methods and pedagogy classes. However, as noted by Tutro in a recent review of literature relating to choral research from 1996–2002, the topic of female voice change at adolescence remains relatively unexplored.

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Learning from the Past

Over the past fifty years, teachers and pedagogues such as McKenzie, Swanson, Cooper, and Cooksey have devoted considerable study to the male adolescent voice. Naidir, Zboril, and Sevick, Cooksey, Groom, and Killian are but a few who have conducted research studies that have added to the body of knowledge concerning the stages of vocal maturation, the vocal characteristics of each stage, and methods of voice classification.

Comparatively, little study has been devoted to maturational effects on female adolescent voices. These young voices also present characteristic symptoms such as breathy voice quality, difficulty initiating phonation, decreased pitch range and tessitura, and register transition fluctuations, including abrupt "breaks." These symptoms directly affect the selection of repertoire, the development of practice/rehearsal strategies, and the selection of vocal techniques to be used with these young voices.

One possible reason for this lack of available information concerning the female voice change may be that the voice maturation process is not nearly as noticeable in females. Historically, there has been a recognition of, and resignation to, the breathy, thin and often colorless adolescent girl's voice. One widely accepted assumption was that female voices do not really change, but instead, merely develop during the adolescent period. Finn stated that "the girl's nature will develop rather than undergo change, and her throat will attest this fact by merely growing, escaping the anatomical readjustments of her brother."

Despite the many different types of voices and vocal capabilities that are encountered, the constant objective of those who work with adolescent voices is to create satisfying musical experiences for these students while facilitating healthy vocal development. With this goal in mind, voice educators, music educators, and choral conductors of adolescent singers (late elementary, junior high, middle school, and early high school) need:

- an understanding of the sequence/symptoms of change involved in adolescent voice maturation;
- an understanding of the potentials, limitations, characteristics, and unique qualities that may be encountered in individual voices;
- a working knowledge of ways to assess the vocal and musical abilities of each young singer, and ways to help them develop healthy, efficient personal voice skills for self-expression in speaking and singing;
- a working knowledge of how to select music that is within the physiological capabilities of maturing adolescent voices, and how to appropriately assign vocal parts so that vocal skills are facilitated rather than impeded.

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• the ability to audibly recognize unhealthy voice production in adolescent developing voices and thus encourage efficient speaking and singing.

Summary of Current Knowledge Regarding Female Adolescent Voice Change

Although these changes are not nearly as extensive as those observed in the male, there has been increasing recognition that female voices go through various anatomical changes during adolescence. Adolescent female voices exhibit symptoms that are similar (though perhaps not as dramatic) to those found in the male changing voice. These characteristic symptoms include:

• increased huskiness/breathiness of tone;
• lowering of speaking voice;
• decreased and inconsistent range (tes-situtae tend to fluctuate);
• noticeable changes in timbre (tone quality);
• voice "breaks"/cracking (Note: The first acoustical data on vocal pitches of girls was reported by Fairbanks, Herbert and Hammond. They also noted voice breaks which were formerly thought only to be characteristic of boys' voices.);
• obvious transition notes or register breaks;
• insecurity of pitch; and
• difficulty initiating phonation.

Exactly when these changes take place and how other biological factors affect voice change in adolescent females continues to be an area of study and exploration.

Through the years, the following physiological changes and symptoms of change have been noted by researchers as well as those in the medical profession:

• Huskiness/breathiness of tone is at least partially due to the "mutational triangle" or "glottal chink." This gap between the aryepiglottic is "typical of young singers whose voices are changing. It represents a weakness (due to development of the vocal arytenoid/arytenoid muscles. The sound is that of a clear little voice, accompanied by the rustling of "wild air" through the chink. It is the characteristic sound of the breathiness of young voices...."

• The vocal folds of the female adolescent increase in size approximately 3–4 mm., while the vocal bands of the male adolescent increase up to 1 cm. Further, Kahane noted that the male vocal fold length increased by an average of 66.69 percent from pre-puberty to adulthood, while the female vocal fold length increased by 24.03 percent. (See Thurman and Klitzke, 2000, for a review.)

• Seth and Guthrie first observed that the lower limit of the girl's vocal range falls approximately a third and the upper limit rises slightly (the lower limit of the changing male voice ultimately "falls" an octave). Hollien noted that the average speaking fundamental frequency in female voices is more gradual than boys, possibly only one semitone per year. Additionally, Duffy observed that the average speaking fundamental frequency decreased successively with age. He also noted a difference of one semitone in average speaking fundamental frequency in thirteen-year-old pre-menarcheal and thirteen-year-old post-menarcheal females (the latter being lower).

• Weiss noted that during adolescence, the female larynx increases in size and weight, though not as dramatically as that of the male larynx. According to Kahane, the male larynx increases more in width (posterior/anterior) and thus the two are distinctively different from each other.

• Thurman and Klitzke also discuss the increase in the size of the resonator or overall vocal tract length, though the male vocal tract becomes both broader and develops a greater circumference. The size of the resonator obviously yields differences in overall timbre. This state that the vocal tract "needs to be included"
in a meaningful voice-classification scheme." In musical instruments, the size of the resonator has as much to do with the resulting sound as does the "sound source." Thus, the growth of the vocal tract results in the deepening or richness of the voice as it approaches young adulthood.

- Hormonal secretions at the onset of puberty are observable in various physiological changes: skeletal growth, thearche (breast development) and menarche (onset of menstruation). Specific observable stages of thearche and menarche were developed by James Tanner and are widely used by the medical profession to mark physiological changes in adolescents.

- Laryngologists such as Broditz suggest that menarche and lowering of pitch in female voices are simultaneous. Williams investigated singing- and speaking-voice characteristics through comparison of pre-menarchal and post-menarchal girls. Even though they both experienced some degree of voice breaks, cracks, pitch changes, inconsistencies in speaking, breathy voices and sore throats from singing, in all cases the post-menarchal girls identified these symptoms as happening more often than the pre-menarchal girls. Still, no conclusive evidence links voice change directly to menarche.

- Cyriger noted the upper transitional pitch (lift point or passaggio) of the female voice tends to be higher in fourteen- and fifteen-year-old than in ten- and eleven-year-old females.

- It appears that the onset of puberty is occurring at much earlier ages. Tanner noted that though the sequence (stages) of adolescent development remains relatively unchanged throughout the years, the age at which development begins is earlier and the pace at which development proceeds is faster than reported in previous years. He noted that forty years ago, menarche was reported to begin at an average age of fourteen years. Today, menarche usually begins before the thirteenth birthday. In fact, menarcheal age appears to be decreasing three to four months per decade. (It is important to note that menarche occurs late in the development sequence after breast budding; generally, after the peak of the height spurt.) Additionally, females tend to enter puberty earlier than males. Rogoś, Rennichi, and Clark state that the female growth spurt can be observed between the ages of ten and twelve, while in boys, the growth spurt tends to be between the ages of twelve and fourteen.

This information indicates some important trends concerning voice change. Perhaps an example can be observed in
the study by Rutkowski. The voice classification stages set forth by Cooksey were employed to investigate their practical application in a three-year longitudinal study of ten male adolescent subjects. It was observed that the subjects generally progressed through the stages outlined (sequence) by Cooksey, but noted that boys participating in the study consistently entered classifications Midvoice II, Midvoice IIA (high point of change) and New Baritone one year earlier than originally observed by Cooksey. If there is a correlation between voice change and menarche, and given that the age of menarche is actually decreasing, then one might expect that voice change in females is also occurring earlier than previously expected.

In my 1991 article, I proposed a framework for voice classification/maturation for changing female voices based on empirical evidence gathered over several years of working with these young voices. This information has subsequently been cited in choral methods texts by Phillips, Collins, Hylton, and again in Phillips’ latest text. Recently, I have begun to think of this framework in terms of phases rather than stages due to the gradual nature of the changing process over time. Obviously, there is a great need for more knowledge concerning these young voices.

Criteria for Classifying Adolescent Female Voices
In classifying female changing voices, the following criteria are suggested:

- average speaking pitch
- vocal range/tessitura
- register development (appearance of passaggi)
- overall voice quality (timbre)

These criteria can be determined by listening to individual students. Barham as well as Cooksey advocate charting vocal ranges on a periodic basis (every six to eight weeks).

The steps below can be used to obtain the criteria described above:

Average Speaking Pitch
(1.) Have students slowly count backwards from 10 (approximately J=92). Try to discourage breaks and pauses between the numbers. Rather, have students speak on a continuous stream of air.

(2.) Listen carefully and match the “average” pitch heard on the keyboard.

(3.) Notate this pitch on a range chart/audition form.

Note: One can train the ear to be quite proficient at discerning this pitch with just a little practice! Additionally, I often find that girls tend to speak at unacceptably low habitual pitches and without support of the breath. This can yield unusually low average speaking pitch. If this occurs, have the student project the voice across the room. I try to explain that I am not asking that they ‘scream’, but merely use the breath to project the voice—or, “put the voice on the breath!” This usually results in the raising of pitch, giving a more accurate average speaking pitch for the student.

Also, as a rule of thumb, the lowest usable singing pitch is approximately a minor or major 3rd below the average speaking pitch.

Vocal Range
(1.) Starting just above the speaking pitch, have the student vocalize on an [a] vowel. (This is not the vowel that I typically use for warm-up with young voices. However, for diagnostic purposes, the [a] vowel allows for a better vocal example.)

(2.) Vocalize the student on a 5-note descending scale (sol, fa, mi, re, do), moving steadily downward in the range, listening for continued ease of production. Notice when the timbre changes or strain comes into the tone.

(3.) Notate the lowest singing pitch as the
(4.) Return to the starting pitch and repeat the process moving upward to the highest produced singing pitch.

(5.) Notate this pitch as the “upper terminal pitch.”

Note: Often, students need encouragement to accomplish this task in order to reveal a more accurate reading of vocal range. For this reason, making the student feel at ease and comfortable is very important. Once this trust is built, encourage the student to:

a. open the mouth more by relaxing the jaw;
b. use more breath support;
c. sing a couple of “sirens” to overcome tension or basic inhibition; and
d. use kinesthetic motions (circles, etc.) with hands or arms to help release tone.

Tessitura
(Comfortable Singing Range)

(1.) Using an [a] vowel, have the student crescendo on a specific note within the range, listening for the best “color,” ease of production, clarity, volume, etc.
(2.) Ask the student to sing a familiar song such as America in various keys (F major, A major, D major).
(3.) Note the span of notes where the greatest ease of production, clarity and volume occurs.

Register Development

As the voice begins to develop, register changes (readjustments) can be observed. The first most obvious transition note is often found from F – A above middle C. To observe this occurrence, the following process can be used:

(1.) Have the student sing an ascending major scale starting at A or A⁺ below middle C.
(2.) Listen carefully for the audible difference in timbre at the interval mentioned above. This difference in timbre will generally be heard on one specific note and the next note will be heard in the new register.

Note: Sometimes, this is difficult to perceive in students with vocal/choral training (further supporting the fact that vocal training during adolescence can help to facilitate vocal development and thus, improve tone production.)

As the voice continues through maturation, this particular readjustment becomes less pronounced and the appearance of the transition note at the top of the staff at d²-f³. (approximating the transition found in the adult soprano voice) becomes more apparent.

Vocal Quality

Overall, vocal quality is probably the easiest criteria to observe. For those working with middle school/junior high voices, a breathy and husky vocal quality is familiar and generally associated with adolescence. In determining voice classification based upon developmental phases, one needs the ability to discern the subtle differences which occur in the girl’s voice as it proceeds from the flute-like child voice to the breathier mutation-al phases. During the high point of voice change, this breathiness is most obvious. As the voice continues toward the young adult phase, breathiness tends to diminish and the resulting timbral change is that of greater clarity and resonance.

Current Research

In the mid-1980s, Bottoms and Williams conducted research regarding pedagogical techniques for tone development as well as speaking- and singing-voice characteristics. Fett and Huff-Gackle examined the effect of vocal skills instruction on singing performance and breath management. Sipley further examined the effects of vocal exercises, knowledge of the voice and the vocal development process on tone quality, and vocal self-image of adolescent girls. Additionally, Welch and Howard provide a wonderful overview of recent research comparing the development of male and female voices. The focus of this article centers on the all-male tradition of cathedral choristers and the categorical perception regarding the “uniqueness” of male choristers vs. female choristers in English cathedral choirs. Presently, only one longitudinal study
exists concerning the vocal development of female choristers at Wells Cathedral in the United Kingdom, conducted by Welch and Howard. This study reports acoustic data for three individual female choristers. Data collection occurred over a three year period and indicates that on specific measures, (larynx closed quotient (CQ), overall amplitude and acoustic spectrum) there are developmental variations in both individual and group performance.

It has long been my desire to conduct a longitudinal study concerning female adolescent voice. After almost twenty years, it appears that this study will commence within the next year. Perhaps the delay has been fortuitous. Twenty years ago, we did not have the technological means to examine some of the important acoustical issues concerning voice change/development. Today, the technology is more accessible and more sophisticated, potentially yielding more precise information.

Additionally, there is a continuing trend in research to form inter-disciplinary groups of researchers (which includes the voice scientist, speech pathologist, pediatrician, and otolaryngologist) to study certain phenomena such as adolescent vocal development. Thus, a team has been assembled to help in the gathering and interpretation of this data in the upcoming study.

Singing, Adolescence, and Self-Concept

As I reflect on my teaching and personal musical experiences through the years, I am continually intrigued by the tremendous effect that music-making (particularly singing) has on our lives. Music does make a difference in our life-experiences. Through the singing/choral experience, positive changes can occur in the lives of our young people, helping them to develop into emotionally whole human beings.

According to Eversol, Bostik, and Paulson, we live in a culture where teen suicide and self-abuse is increasing. In her book, “Reviving Ophelia: Saving the Selves of Adolescent Girls,” Pipher examines the tumultuous time of adolescence in females. She states, “[T]he gap between girls’ true selves and cultural prescriptions for what is properly female creates enormous problems.” She notes that girls in adolescence appear to be “losing” themselves. The end result is often self-destructive behavior. Our culture has become one in which the souls of these young people are becoming lost while longing for acceptance.

This reference to Ophelia, the tragic young character in Shakespeare’s Hamlet, is very appropriate in terms of female adolescence. Ophelia’s life demonstrates the destructive forces that affect young women during adolescence. As a girl, Shakespeare’s Ophelia is a typical happy-
go-lucky child, but in adolescence, she loses herself. Torn between pleasing those around her, (her value being determined by the approval of others much like girls today value themselves through peer approval and society), she is torn apart and loses her life as she desperately seeks to please others.56

What does this mean for those of us who teach these young people? We must be aware of the changes and pressures that they face. We must be able to help them navigate not only the changes of the voice, but also, the often harsh realities of adolescence. In an age when adolescent girls seem to be losing themselves, finding ways to help encourage self-esteem and view themselves as talented, worthy, and special human beings is highly important. Given this information, one begins to sense the potential difference that music can make within the hearts and minds of these students.

Hylton investigated the meaning of the high school choral experience and found that it may positively influence students’ self-knowledge.57 In an unpublished article, Judy Bowers and I asked students to rate their agreement/disagreement with statements regarding specific attitudes relating to singing. The following statements were highly rated by the respondents (86–87 percent, respectively): (1.) “When I sing, I feel better about myself and my abilities” and (2.) “When I sing, I feel as though I can express my inner feelings.” Though these responses were informal in nature, it appears that music, specifically singing, may provide a viable outlet for self-expression and a mechanism for encouraging positive self-esteem in young females.58

Summary

Twenty-five years ago, there was only general agreement that female voices actually go through a recognizable maturation process. Virtually no study had been given to the topic of the female adolescent voice and its development. Within the past twenty years, the topic has been given greater consideration and interest has grown regarding the training and cultivation of this young voice.

Even with these recent changes, there still exists an open field for discovery about the development and training of girls’ voices. In most of our choral programs, the participation of girls far surpasses that of males. Thus, there is an obvious need for knowledge and greater understanding of the events that herald this vocal change.

As we study the voice, it is also important to remember the inherent “personal” nature of this facet of the human experience. The voice is an integral part of the total person, inextricably tied to thoughts and emotions. Perhaps the power of music—of singing—can also enable our youth to cope with some of the societal issues and pressures of our time. By encouraging students to look at life through the artistic prism known as music, they may be able to see past today and somehow glimpse the hope of their tomorrows. Could it be that by finding Ophelia’s voice, we open Ophelia’s heart?

NOTES


10 John M. Cooksey. “The Development of

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36 Tanner, J. (1972) (op cit.)


39 Cooksey, (1977b) op cit.


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