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Abstract

of

Doctoral Dissertation on the Topic

"CONTEMPORARY APPROACHES TO INDIVIDUAL WORK WITH  
CHANGING VOICES"

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The dissertation contains 264 pages, including 169 pages of main text and four appendices.

Appendix IV includes 53 interviews conducted by the author with vocal pedagogues.

The cited and primarily used literature in the bibliography consists of 86 titles in Cyrillic (60 in Bulgarian and 26 in Russian) and 50 works in English by English and American authors. Additionally, 8 internet resources are referenced in the sources.

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## INTRODUCTION

The field of vocal pedagogy has undergone an intriguing and ongoing journey, intertwined with scientific advancements since the introduction of the laryngoscope by Manuel Garcia Jr. in the late 19th century, specifically in 1885. From that time to the present, as a result of the technological revolution, research on the voice has become increasingly profound, contributing to a more comprehensive understanding of laryngeal function. These scientific investigations and discoveries about the vocal mechanism have enhanced the methodology of vocal pedagogy. We no longer rely solely on personal experiences but, instead, employ objective analysis to incorporate these new scientific insights into our practical work.

My inquiries and research primarily focus on the changing voice during adolescence, commonly referred to as the voice mutation. This interest was spurred by my desire to assist my students, guiding them through this crucial period so that their voices can develop fully across their entire range and maintain their vocal health over time, despite the changes they undergo. To achieve this goal, I conducted extensive research and held over 50 interviews with my fellow vocal pedagogues, who, to my delight, supported my belief that singing should not cease during the mutation period. On the contrary, working with the vocal mechanism is essential, and this can be done through "gentle technical exercises, with the teacher carefully monitoring the changes in the range and timbre of the voice," as Professor Srebra Mikhaileva suggested.

The primary objective of this dissertation is to analyze the scientific research on the changing voice to date and propose a new methodological approach for working with the voice during this period. I believe that my extensive research on this topic, personal correspondence with vocal pedagogues from the United States and England, my personal practice, and the interviews conducted with my fellow vocal pedagogues will mark a new beginning in Bulgarian vocal pedagogy. This fresh approach emphasizes that the changing voice is a developing voice, and undoubtedly, work with it should never cease.

I have enriched my methodology for training voices during the mutation period, adhering to a fundamental principle in vocal education - to avoid harming the vocal apparatus during the mutation. I employ innovative approaches and techniques that ensure the essential development of mixed resonance across the entire range and precise control of timbre, qualities that every singer requires in today's context. Naturally, I prioritize the uniqueness of each student. As the vocal jargon goes, "no two throats are alike." The same applies to their psyche.

Nonetheless, my ultimate goal is for each of them to gain a thorough understanding and expression through their voice.

The primary objectives I have set for this dissertation are as follows:

1. Analyzing and organizing existing scientific research on voice training.
2. Providing a comprehensive explanation of the specifics of the adolescent voice transition, especially the changes in the voice.
3. Highlighting the significance of scientific research for understanding the functioning of the vocal mechanism and its practical application in vocal pedagogy.
4. Presenting innovative approaches and practical exercises derived from my personal practice.
5. Conducting interviews with fellow vocal pedagogues to validate the central question in voice training during the mutation – not ceasing singing practice.
6. Emphasizing the importance of scientific research regarding the influence of music on individual brain structures and Howard Gardner's theory of multiple intelligences.

This scientific work is structured as follows: **an introduction, four chapters, and a conclusion**. There are four appendices, which describe a diagnostic chart, a lesson plan, specific breathing exercises for strengthening and developing the voice, and 53 interviews with vocal pedagogues (Appendix IV).

**The first chapter** reviews scientific studies and methodologies for voice training during the mutation period from the mid-20th century to the present day. It introduces the most significant theories for working with the mutating voice from American vocal pedagogues. The chapter also comments on the extent to which the topic of the mutating voice is discussed in Bulgarian vocal pedagogy. **The second chapter** is dedicated to the voice during the mutation, exploring the physiology and anatomy of the larynx, stages of voice changes in boys and girls, and reasons for these vocal changes. **The third chapter** is the core of the research and focuses exclusively on the practical methodological work of vocal pedagogy. It presents innovative approaches for diagnosing the issues of changing voices (diagnostics) and basic tools for resolving these issues, including vowels and consonants, vocalization, and voice demonstrations. It explains the two modes of vocal mechanism operation – speaking and singing, their functionality, and differences. The proposed vocal exercises are mostly from my personal practice, logically organized for addressing various vocal problems. Special attention

is given to singing breathing and establishing vocal support. **The fourth chapter** relates to innovative approaches applied in pedagogical vocal practice to develop basic vocal habits based on studies of brain function and Howard Gardner's theory of multiple intelligences. **In the conclusion**, specific emphasis is placed on the fundamental rules for preserving and preventing issues in children's voices, as well as summarizing the contributions and guidelines presented in this work.

## **CHAPTER I: WORKING WITH THE CHILD'S VOICE**

### **1.1. A General Historical Overview of the Concept of Working with the Child's Voice. Fundamental Theories on Changes in the Child's Voice during Mutation**

Historically (up to the 1970s), numerous choral conductors and vocal pedagogues worked on addressing changes in boys' voices, offering different classification systems. Some of the most popular ones were: 1. The "Alto-Tenor" concept by Duncan MacKenzie<sup>1</sup>; 2. The "Cambiata" concept by Irvin Cooper<sup>2</sup>; 3. Frederick Swanson's<sup>3</sup> theory, followed by John Cooksey's<sup>4</sup> "Modern Eclectic Theory" (1977); 4. "Voice Expansion" by Henry Leck<sup>5</sup> (2009); 5. "Teaching Kids to Sing" by Kenneth Phillips<sup>6</sup>.

This led to a shift in the vocal sound model in the emerging pop culture, distinct from the prevailing classical vocal practices until that time. Researchers of the child's voice, such as Irvin Cooper, Duncan MacKenzie, Frederick Swanson, John Cooksey, and, in recent times, Professor Gackle, an innovator in the study of adolescent girl voices during mutation, Professor Geneva Williams, with whom I had the privilege to work, Kenneth Phillips, and Henry Leck, among others, scientifically proved that singing practice should not cease during mutation. They introduced a new perspective on the developing child's voice, which continues to be a subject of debate and research today.

Undoubtedly, vocal pedagogue and researcher of boys' voices, John Cooksey, is regarded as the leading authority in this field. He succeeded in synthesizing and enriching the work of his predecessors and took the understanding and classification of boys' voices to a deeper level. In 1970, Dr. John Cooksey studied more than 100 boys and identified five stages

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<sup>1</sup> Duncan MacKenzie – English music educator.

<sup>2</sup> Irvin Cooper – a prominent American educator, creator of the "Cambiata" concept for working with boys' voices during mutation.

<sup>3</sup> Frederick Swanson – an American vocal pedagogue and researcher of the child's voice.

<sup>4</sup> John Cooksey – an American vocal pedagogue, creator of the modern eclectic theory.

<sup>5</sup> Henry Leck – an American vocal pedagogue and choral conductor, creator of the Expanding Voice Theory.

<sup>6</sup> Kenneth Phillips – an American vocal pedagogue and professor emeritus.

of change in their voices, which he detailed in his book "Working with Adolescent Voices." In his Contemporary Eclectic Theory (CET), unlike his predecessors, he asserted that the changes in adolescents' voices are sequential and predictable. Cooksey established a typology for classifying the changes in boys' voices based on the following criteria:

1. Total range – extreme pitches.
2. Tessitura – the comfortable singing range.
3. Sound quality – levels of tension, levels of breath support, etc.
4. Register development.
5. Average fundamental speaking frequency.

### **1.2. Bulgarian Vocal Pedagogy Regarding Adolescent Voices Undergoing Change**

Within Bulgarian vocal pedagogy, the subject of working with adolescent voices experiencing changes is well-recognized. This topic has been the focus of various academic dissertations, which I will describe further. Since vocal education for young individuals has primarily been associated with choral singing, most relevant information concerning changing voices is found in research conducted by choral conductors. A significant part of them recommended that young boys should suspend vocal activities during their transitional period. This viewpoint persisted within the vocal community until the introduction of popular and jazz programs in high schools after the year 2000. This shift in education required a change in approach towards vocal instruction, particularly concerning the voices of adolescents undergoing change. Nonetheless, there is a notable absence of a specialized written methodology tailored to address this specific phase of vocal development within Bulgarian vocal pedagogy. This knowledge gap can be attributed to the fact that, until the introduction of popular and jazz programs in high schools, Bulgaria's vocal education primarily revolved around classical singing. In contrast, the United States and the United Kingdom had initiated individualized vocal training programs with innovative methodologies much earlier. The American methodology known as Speech Level Singing (SLS) was established by Seth Riggs as far back as the 1970s. It was succeeded by Jo Estill's methodology (EVT - 1988) and the Complete Vocal Technique (1992) by the Danish researcher Cathrine Sadolin. Concerning training during the period of vocal transition, this practice has been standard in the United States since the 1940s.



Nonetheless, the contributions of Bulgarian choral conductors should not be underestimated. In Lydia Dimova Stefanova's<sup>7</sup> 1984 work, "Studies on Vocal Changes during Puberty and Adolescence in Young Singers," there is documentation on research conducted by the leaders of prominent children's choirs in the country, such as the "Bodra Smyana" choir and the "Children's Radio Choir."

Another noteworthy figure in vocal pedagogy and the choral scene is Georgi Deliganev. In 1980, his book, "Vocal Work in Choirs," was published, representing a significant development in this field within Bulgaria. The book primarily caters to choral conductors and vocal pedagogues, addressing various essential topics, including voice classification, singer grouping based on vocal characteristics, vocal techniques like breathing, support, attack, resonance, and the concept of vocal registers.

Another doctoral dissertation authored by Professor Dr. Vesela Geleva provides a specific examination of vocal development during the period of transition. Her work, "Specifics and Education of the Singing Voice in Childhood and Adolescence and Some Issues of Its Application in the Choir Collective" (2006), delves into the complexity of the vocal changes that occur in three distinct stages of mutation. She analyzes elements such as vocal range, sound quality, timbre, and also takes into account the psychological qualities and prerequisites essential for the development of choral and singing skills. While participation in choirs encourage discipline, musical aptitude, memorization, concentration, and collaborative skills, the majority of vocal pedagogues argue that choral singing tends to unify the voice. As a result, students may struggle to nurture and express their unique vocal qualities. Therefore, individualized guidance for each student, particularly during the phase of vocal transition, is deemed crucial within the context of solo singing.

## **II. THE VOICE DURING MUTATION**

### **2.1. Anatomy and Physiology of the Larynx**

The larynx is an organ located above the trachea and houses the vocal cords. It is composed of hyaline and elastic cartilages, ligaments, and muscles, which are intricately connected and interact in complex ways. In this section, I will focus on the laryngeal components crucial for understanding proper sound production. The primary cartilages that

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<sup>7</sup> Lydia Dimova Stefanova (†) - Senior Lecturer in the Vocal Department at the Music Academy.

form the laryngeal structure include the epiglottis, thyroid cartilage, cricoid cartilage, and paired arytenoid cartilages.

The muscles of the larynx can be categorized into two groups: external and internal. External muscles are involved in actions such as coughing, shouting, swallowing, and others. When these muscles contract, the larynx moves either upward (during swallowing) or downward (during vocalization). These external muscles encompass the entire vocal tract, and their involvement in the singing process should be minimized.

### **Internal Muscles**

The internal muscles of the larynx are both paired and unpaired. They perform various functions, including widening or narrowing of the glottis, tension or relaxation of the vocal cords, constriction or expansion of the larynx's entrance.

### **Ligaments in the Larynx**

The significance of the ligamentous apparatus is often underestimated and neglected. Ligaments are connective structures that link the cartilaginous components. Unlike the voluntary control of striated muscles, ligaments are not under voluntary control. However, they are responsive to hormones and can be influenced by them, particularly with progesterone causing a notable relaxing effect.. This explains the rapid fatigue of the vocal musculature as it strives to compensate for the hypermobility of the rigid structures, using much more energy corresponding to the increased work they perform during mutation.

### **Why Singing Shouldn't Stop During Mutation**

All the vocal pedagogue colleagues I interviewed (with some exceptions, mostly classical singing teachers) believe that vocal training should not be halted during the mutational period. Colleagues who teach classical singing may have certain biases, which is understandable. Due to the rapid growth of cartilages and their continuing flexibility, they remain moldable under the influence of muscle contractions. In other words, it can be said that, much like water shaping rock formations over time, muscle strength leads to traction at the point where cartilage attaches, resulting in a change in its shape. This alone allows, with proper muscle training achieved through correct techniques, teaching methodologies, and consistency, the preservation of the parameters of changing cartilages at the beginning of the mutational process. This will lead to greater stability in sound production and the development of an internal sense for working with vocal musculature.

## 2.2. Causes of Mutation

Before delving into the specifics of mutation and its effects on children's vocal development, let's take a closer look at the maturation period – adolescence. This is an extraordinary phase in the lives of adolescents, qualitatively different from childhood and adulthood. During this time, they gradually become self-aware as young adults, experiencing periods of doubt, aspirations, dreams, inexplicable mood swings, sleeplessness, and heightened sensitivity to their surroundings. While the behavior of adolescents and their physical changes have traditionally been explained primarily by hormonal factors, especially the surge in sexual hormones during puberty, a more comprehensive understanding of these changes goes beyond simple cause-and-effect relationships. Recent research into adolescent brain development has added a new dimension to the theory of hormonal influence during puberty. The teenage brain differs from that of adults because it continues to develop and establish complex neural connections between different regions of both brain hemispheres. As Professor Dr. Frances Jensen<sup>8</sup> explains in her book "The Teenage Brain," brain maturation progresses from back to front, and during adolescence, the frontal lobe is the least developed, with the least organized network of connections. This area is responsible for executive functions such as risk assessment, self-awareness, abstract thinking, planning, and impulse control. The connections to and from the frontal lobe are the most complex and are the last to develop. Consequently, adolescents often experience distraction, disorganization, drowsiness, impulsivity, and a tendency to make poor decisions during this period.

Returning to the topic of hormones, the body's physiological processes are regulated by two main systems: the endocrine and nervous systems. "Endocrine regulation is achieved through the action of biologically active substances secreted by the glands with internal secretion, known as hormones, as named by the renowned English physiologist Starling at the beginning of the 20th century. "[Ganchev, R. and L. Vitanova. Human Physiology. Sofia, 2008, p. 329]". It has been scientifically established that major sex hormones, including testosterone, estrogen, and progesterone, have a significant impact on the voice, especially during the period of mutation in both boys and girls. For example, in girls, the predominance of the hormone progesterone, which relaxes connective tissues and muscles, contributes to a smoother progression of vocal changes compared to boys. In boys, a sudden increase in testosterone levels

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<sup>8</sup> Professor Dr. Francis Elizabeth Jensen – Professor of Neurology at the University of Pennsylvania, USA.

and a relative decrease in female sex hormones result in the rigidity of the laryngeal mechanism, explaining the occurrence of voice "breaks" or "cracks."

The mutation itself occurs in stages. The period just before mutation, lasting several months (3-4), is characterized by children's unwillingness to sing and quick fatigue, especially when singing in a high pitch. These initial changes are barely noticeable, with the only indication being insecurity in intonation. The actual mutation period is marked by fatigue, hoarseness, voice tremors, a narrowing of the vocal range, and "leaping" from one register to another due to muscle imbalances in the larynx and inequalities in cartilage sizes. Vocal folds, which measure 6-8 mm in a 12-13-year-old child, grow to reach 14-20 mm in females and 20-27 mm in males. Moreover, as they lengthen, the vocal folds do not change in width, as the larynx grows more rapidly in length than in width. The resonance chambers lag behind the growth of the larynx, and the epiglottis often remains child-sized even in adolescents. The post-mutation period should not be underestimated. Anything preserved and modified in terms of vocal habits during the pre-mutation and actual mutation periods now undergoes further development and refinement. Young voices that have undergone changes are still unstable and require consistent support and understanding from a vocal coach.

Based on my observations and in line with international research, mutation in both boys and girls typically occurs between the ages of 13 and 15. Naturally, there are always exceptions. New students in the pop and jazz singing class often have husky voices, a limited vocal range, and a lack of control over laryngeal and torso muscles. Emotional instability continues over the next two years. Typically, boys begin to stabilize psychologically at the end of the 10th grade and the beginning of the 11th grade. They become more self-aware, determined, active in their actions, and participate as full partners in vocal training classes. They handle vocal terminology well, have somewhat better control over laryngeal and torso muscles, and participate appropriately in the selection of songs, both in terms of genre and technical aspects.

### **2.3. Stages of Development in the Changing Girls Voice**

Sexual maturation in girls begins earlier than in boys, but unlike boys, the change in their voices is subtler and less noticeable. It manifests as a shift in the quality of the sound and can be recognized by an increase in roughness and breathiness in singing. This is due to some relaxation and thickening of the laryngeal musculature, especially the M. Interarytenoids and M. Thyroarytenoideus. The vocal folds are unable to fully close along their entire length,

creating a small gap in the back of the vocal folds, leading to hoarseness and breathiness in the voice.

Girls' voices respond to their menstrual cycle. A few days before their period, the vocal cords swell slightly, which affects pitch accuracy and sound quality. Given the changes that occur during this period, song selection needs to be done very carefully. It is essential to pay more attention to emotions and musicality. It's crucial to remember that the larynx is still undeveloped and potentially vulnerable. Adolescent girls still have limitations on their vocal capabilities, such as range, speed, strength, and sustain. Overall, the development of a stronger and richer vocal timbre and the technical capabilities of adolescent girls isn't much different from those of girls who are five years older. In other words, vocal development doesn't complete with the end of the mutation period.

On a global scale, research on changes in girls' voices during mutation hasn't stopped and continues to this day. However, one of the pioneers in this field is Professor Lynn Gackle from Baylor University in Waco, Texas. She conducted a ten-year study on this subject, authored numerous books, is a choir conducting instructor, and has received prestigious awards. Professor Gackle uses the following criteria to classify girls' voices:

1. Average speaking pitch
2. Overall range and working range (modal)
3. Transition zones (changes in pitch quality)
4. Voice characteristics

She defines the following stages of mutation in girls:

1. Pre - mutation – no voice changes
2. Pre - menarcheal period
3. Post - menarcheal period
4. Young Adult Female

**Registers.** In *The Oxford Handbook of Singing*, we read: "The definition of registers in vocal pedagogy is highly disputed," and it continues to be so. "Registration is an aspect of phonation, based on changing vocal folds shapes and vibratory patterns through the singer's range. The change points between registers (points of transition) may lead in changes in voice quality or loudness and sometimes to pitch instability. Singers of different musical genres will

approach registration in different ways.” Furthermore, "To date, no research studies have found evidence of a separate middle register." [Welch, G. Howard D., Nix J, editors. *The Oxford Handbook of Singing*, Oxford University Press, 2019, p. 713 – 714].

Jeanie Gagne, a vocal coach at Berklee, works on the same principle regarding registers. She states: "...the human voice has only two usable registers; these are usually called 'chest voice,' dominated by the TA muscle, and 'head voice' or 'lighter voice', dominated by the CT muscle. Most of the time when we sing, these two registers work together as an interaction between the TA and CT muscles. Other registers result from variability in how these muscles interact with each other. Understanding the voice as a blending of these highly flexible functions is much easier and more precise, a way of perceiving how the vocal mechanism moves through your entire range and sound qualities." [Gagne, J. *Belting: A Guide to Healthy, Powerful Singing*, Berklee Press, 2015, p. 22].

To effectively conduct vocal training that meets the specific requirements during the mutation period, it is necessary to examine the register structure of adolescent girls and their tessitura. Typically, the registers in girls remain fundamentally the same as in children before entering the mutation phase. In his book *Teaching Kids to Sing*, Professor Emeritus Kenneth Phillips writes: "The middle voice is similar to that of the child – a sharing of lower and upper registers. The traditional treble voice break between chest and upper registers, which occurs at approximately pitch a1 for untrained singers, does not exist when this proper sharing of lower and upper registers is learned. The pure upper voice begins around c2 and extends upward an octave to c3. The main problem for beginners is that they limit themselves to one register – the middle or mixed voice. As they venture above pitch c2, they fail to remove the weight of the lower vibratory pattern from the voice. This added weight of the lower voice prohibits the ease of production in the upper voice, the range of which then tends to end around f2. This is compounded by an elevated larynx which interferes with the shortening and thinning of the vocal folds. All females (including altos) should perform vocalises in a light manner, from c2 to c3. This helps them learn the feeling of moving to an inner-edge-only vibratory pattern of the vocal folds, thus eliminating all lower-voice production." [Phillips, H. K. *Teaching Kids to Sing*, 2nd ed. Boston, USA, Schirmer, Cengage Learning, 2014, 1996, p. 119].

To develop the full potential of the voice, it is necessary to work across the entire range without fixation on specific parts. Depending on the individual indicators in the voice diagnosis, the vocal coach will assess whether to work on light (dominance of the CT muscle) vocal mechanism or applying more weight (requiring greater mass of the vocal folds during

phonation, dominance of the TA muscle) and changing the position of the larynx. The chest register is important for overall voice development, but excessive fixation on it can create problems in singing. The higher the chest voice is extended, the more problematic and noticeable the transition to the head register becomes. The sound becomes sharp and shrill, lacking volume. In today's pop culture, a vocal model of chest voice across the entire range is prominently showcased, which is imitated by adolescent girls. However, during the process of developing and strengthening changing voices, this singing model is unacceptable and should not be tolerated, even after the mutation is completed.

**Tessitura and Range.** According to the definition of the stages of change in girls' voices and registers, it is necessary to pay attention to the range and tessitura. Professor Kenneth Phillips explicitly emphasizes that the classification of girls' voices is unjustified until the voice is established. He recommends doing exercises both in the high and low registers without labeling them as altos, even mezzo-sopranos, up to the age of 14/15. All girls can sing from b-flat to f2 with a tessitura from d1 to d2.

## **2. Stages of Development in the changing Boys Voice**

Unlike girls, the voice change in boys, known as "mutation," occurs much more actively and can be a stressful experience both physiologically and mentally. It's understandable why this change in boys' voices affects their behavior, emotional state, and social status. On one hand, they must deal with the rapid growth of their bodies and all the accompanying changes, and on the other, they must adjust to and understand the new vocal sound patterns brought about by hormonal changes. In boys, the thyroid cartilage primarily grows forward during this period, especially in the front, where the Adam's apple develops. Medical studies have shown that the laryngeal muscles grow in length first and then increase in mass. In boys, the larynx grows by about 65% over two years compared to 34% in girls [The Oxford Handbook of Singing, 2019, p. 539]. This increased mass means that their voices vibrate at lower frequencies, resulting in a lower-pitched speaking voice. Both boys and girls work with the same registers before the onset of mutation. However, with the onset of mutation, the most noticeable change occurs in the speaking voice's frequency, followed by a gradual lowering in the singing voice. This shift in voice can be likened to moving down an octave, but the range remains extended according to the Expanded Voice Theory (EVT) proposed by Henry Leck.

In contemporary pop culture, boys do not restrict themselves to their "new" voices but actively work with their head voice. This is not just an occasional element in their singing; it

becomes an integral part of their entire vocal range. Singers such as Adam Lambert, Dimash Kudaibergen, Hristiana Loizu, Sam Smith, Vitas, Celine Dion, Whitney Houston, Allen Stone, Aloe Blacc, Prince, Adam Levine (Maroon 5), Brendon Urie (Panic! At The Disco), Freddie Mercury, and others illustrate how effectively the entire vocal range can be utilized. In my practice, I also do not ignore the head voice (falsetto) in boys. I believe that working with it strengthens the chest voice and is a prerequisite for developing a broad, timbrally rich range of at least three octaves.

This approach is supported by publications and books authored by contemporary vocal pedagogues and youth choir conductors. These include Henry Leck and Kenneth Phillips. Henry Leck introduced the concept of Expanded Voice Theory (EVT). In *Choral Journal*, May 2009, he published and described his classification of changing boys' voices. He stated that while the boy's voice changes, it simultaneously expands. Leck presents the entire vocal range as the extreme notes that can be worked on during and after mutation. According to his observations, and in my own practice, working on descending exercises from the upper to the low register through the transitional zone strengthens the newly developed voice.

It's essential to note that classifying voices as tenor, baritone, or bass during the mutation period should not be linked to classifications of mature male voices. Both Henry Leck and Kenneth Phillips have created classifications that are not based on the stages of change in boys' voices but on what can be metaphorically described as "two parts" of the vocal range: the low (chest) register and the upper (head) register. In his book "Teaching Kids to Sing," Prof. Phillips provides a detailed and comprehensive description of the registers in changing voices, linking them to the level of the educational period: middle school and high school. The low register primarily involves the TA (thyroarytenoideus) musculature and corresponds to the chest register, while the upper register involves the CT (cricothyroideus) musculature and corresponds to the head register. During the pre-mutation period, there are only two registers: low and upper. The transition period, or *passaggio*, appears during the voice change (mutation). The vocal coach's goal is to balance the laryngeal musculature TA/CT, enabling boys to transition smoothly from one register to another while preserving the characteristic timbre and depth of sound in each register throughout the entire range.

Undoubtedly, understanding and working with registers are of fundamental importance when working with young singers. The discussion on how, when, and in what manner to work with individual registers is covered in the chapter „Innovative Approaches in Individual Work with Changing Voices “. Although the classifications mentioned above were created by choir



conductors for students participating in choral ensembles, they can be successfully used in individual work with solo singers.

In summary, John Cooksey's eclectic theory, discussed in detail in the first chapter, identifies five stages of voice change during mutation. These stages serve as reference points for vocal teachers. Depending on the stages of change, the teacher will determine the tessitura, appropriate repertoire, and suitable vocal exercises. Henry Leck and Dr. Kenneth Phillips defined the voice during mutation as an extended range. Both the head and chest registers are worked on simultaneously, aiming to gradually balance the laryngeal musculature to achieve the ultimate result – a mixed sound across the entire range.

### **III. DIAGNOSTICS AND PRACTICAL METHODOLOGICAL WORK**

#### **3.1. Structuring and Categorizing Vocal Issues**

Structuring and categorizing vocal issues are essential aspects of the pedagogical process. Typically, these issues are determined by the vocal teacher visually and aurally. When a new student enters the classroom, the teacher should, in a short time, gather maximum information about their temperament, physical condition, verbal and vocal skills, motivation, intellect, social and emotional status. In individual vocal training, this approach - diagnostics - is obligatory. Vocal problems can be provoked by various reasons:

1. Psychological - related to communicativeness, hyperactivity or sluggishness in task execution, fast or slow processing of information, behavioral patterns used by the student as a defense mechanism, fear, shame, etc.
2. Physical - improper vocal posture, incorrect breathing, lowered tonus, possible ailments, unconscious tension in certain body parts - neck, torso, and the diaphragm area.
3. Physiological - related to the direct functioning of the vocal mechanism, improper or excessive closure of the vocal folds during phonation, and an imbalance in the laryngeal musculature - TA/CT. Incorrect tongue position, lips, and facial musculature, lower jaw, soft palate, etc.
4. Acoustic - disrupted sound quality and resonance, inaccurate intonation, lack of coordination between internal and external musical perception, articulation, and more.

The last two categories are particularly critical when determining vocal challenges during the period of vocal mutation. They are linked to the specific functioning of the larynx during this period, especially concerning the vocal folds. When assessing vocal skills, the

quality of sound is the primary indicator of the condition of the vocal mechanism. In individual training sessions with each student, a prepared table is used to record the observed results. Such a table is included at the end of this dissertation.

One of the innovative methods in vocal teaching methodology involves identifying these challenges through diagnostic processes. As previously mentioned, the process of pinpointing problems in sound production begins with the vocal sound itself. Since sound is the outcome of the interactions between various components (vocal folds, muscles, cartilage, and ligaments) within the laryngeal mechanism, it is imperative that this mechanism functions seamlessly, much like a well-oiled machine. In addition to auditory assessments, visual perception is also employed to assist in the diagnosis of sound-related challenges. A well-prepared vocal instructor should be proficient in independently identifying vocal challenges. In his book, "Diagnosis and Correction of Vocal Faults," James McKinney, an American singer and educator, emphasizes the importance of having an ideal standard for sound and tone quality based on the physical laws governing sound, in relation to which the sounds one hears can be evaluated [McKinney, James C. *The Diagnosis and Correction of Vocal Faults*, 1994, p. 13].

### **3.2. Diagnostics**

As described earlier, the primary criterion in vocal diagnostics is the sound, or more precisely, the way of sound production. In the Speech Level Singing technique, which I employ in my methodological work, the types of vocal issues are grouped as "tendencies to" as follows:

1. Pull Chest Voice: This tendency involves forcing the chest voice, widening the vowels, and to open the mouth when reaching high notes. The vocal cords experience high compression, and an excessive amount of air is used when phonating, to sing the chest voice above the first transition for young voices (around A3 to B3). This approach can create a sense of tension when singing higher notes. The extrinsic laryngeal muscles (such as the swallowing muscles and tongue muscles) become involved, complicating vocal cord work, and making it difficult to transition smoothly from one muscle group to another. It's important to note that when I refer to a "forced chest voice," I mean increased vibrational mass; in other words, vocal cords are not working only with their inner edges but with a higher proportion of their muscular-ligamentous mass. In Western literature, this term is equivalent to a heavy laryngeal mode, where the head register corresponds to a light vocal cord mode.

2. No Chest Voice: This category includes two types of students typically encountered in classical or choral singing:

a) Sopranos: These students have been trained to belittle the chest voice.

b) Young girl's voice: This is characterized by a breathy and weak quality throughout the range. For students who sing with a weak chest voice, the work of the vocal folds in the head register (with less vibrating mass) is used as a function for the lower tones in the range. The vocal cords do not engage sufficiently, resulting in a breathy sound in the chest register.

3. Voice Flip or Break: The occurrence of a voice flip during the transition from one register to another is a result of muscular imbalance within the laryngeal musculature (CT/TA). Students need to master a smooth transition between registers without increasing the risk of additional "press" in the passaggio area. There are two types of voice flips:

a) Voice flip due to forced chest voice: In this case, the chest register is pushed to its limits, and the vocal cords cannot withstand the excessive pressure from the airflow. This results in a sharp change in vocal quality during phonation.

b) Voice flip due to insufficient subglottal pressure in the first transition: The flip occurs due to a lack of sufficient subglottal pressure.

4. Mix Voice: Students with an excellent mixed voice navigate through the passaggio zones smoothly, adjusting resonance, maintaining proper vocal cord closure, and connecting registers, creating an even, balanced tone, free from muscular tension.

The primary goal of the vocal teacher is to address these "tendencies to" vocal challenges through the proper and skillful use of vowels, consonants, various combinations of techniques, vocalizations, and breath control. All these listed approaches are tools to address emerging vocal issues and habits. As Professor Hristo Brumbarov emphasized, "The most important aspect in the process of vocal formation is the function of the larynx with its vocal folds, not the breathing, which, despite playing an important role, is ultimately subordinate to the interests of the larynx's function" (from conversations with Prof. Hristo Brumbarov). To avoid random exercises, the vocal coach should pose the following questions during vocal diagnostics:

- What do I hear? (Diagnostics)
- What "tendencies to" do I detect? (Diagnostics)
- What is my goal?
- Which combination of vocal tools will I use to address the vocal issues?

Usually, a young and, indeed, any voice is diagnosed by singing a fifth (do, re, mi, fa, sol) on the vowel "a" throughout the range. Why the vowel "a"? It naturally shapes the oval form of the mouth, with the lower jaw correctly positioned, neither too low nor locked. The tongue is relaxed and freely rests on the lower jaw within the oral cavity. The lips gently part to reveal the teeth of both the lower and upper jaws, but they are not stretched wide in a smile. The facial expression is serene and cheerful. As Professor Hristo Brumbarov pointed out, "The 'a' vowel allows for the redistribution of the two chambers, stabilizes a constant opening of the throat, enabling the necessary indicators for proper voice production". [Kisele, A. The Emergence and Development of Bulgarian Vocal Pedagogy. Some of the Most Important Factors for Voice Production in the Methodology of Prof. Hristo Brumbarov. Sofia, 1975, p. 90].

### **3.3. Mutation and Diagnosis**

During the mutation process, the most encountered vocal problems in voice diagnosis are weak chest voice and forced chest voice. In both instances, students lack a well-defined personal vocal standard for sound. Those singing with a weak chest voice don't grasp the extent to which they need to engage their bodies (respiratory musculature) to produce sound with sufficient energy and projection. I often use an analogy to explain that speaking is like walking while singing is like running. Essentially, the energy they use in speaking mode is insufficient for singing. Therefore, singing demands more mental and physical effort to engage the entire body in the singing process. It is important to gradually build endurance and expand the chest to utilize a larger volume of air. Often, during this stage, students experience dizziness due to increased breathing (hyperventilation) while singing. Hence, it is advisable for beginners to spend most of their class time seated.

Students who force their chest voice need to reduce the intensity of their singing. They must alter their concept of amplification and establish a correct understanding of sound support. Moreover, when exerting force on the sound, the body displays signs of stress, some of which may be visible, like raised shoulders, a forward-pulled lower jaw, or tensed neck muscles. Additionally, there are micro-tensions that aren't visible and must be sensed and analyzed at a more conscious level. Some students experience tension even during inhalation. Others initiate the tone with a hard attack; before producing the sound, there is tension in the diaphragm area. It takes time for students to begin to interpret their sensations. In such cases, applying the

Alexander<sup>9</sup> technique is advantageous. It's an excellent tool to eliminate unnecessary tension arising during singing in any part of the body. Implementing this technique in vocal activities enhances coordination and fosters conscious control over every aspect of the process. It's uncommon to encounter a group of students with naturally placed or well-trained voices.

### **3.4. Essential Vocal Problem-Solving Tools**

Once the vocal condition has been diagnosed to determine its "tendency to" category, the vocal coach needs to decide on a combination of "tools" to address the vocal issues. The primary tools I utilize in my professional practice are vowels, consonants, scales/vocalizations, and vocal demonstration.

What students can manage includes:

- AIRFLOW (PRESSURE)
- VOCAL FOLD ADDUCTION (FORCE)
- VOCAL SOUNDS (FORM)
- And to a certain extent, LARYNX POSITION (mechanical)

• Airflow is linked to the inhalation process, breath retention, and its efficient use during phonation. I will elaborate more on this topic in the subsection of "singing breath."

• Vocal fold adduction refers directly to the vocal mechanism - controlling exhalation/phonation. "Manuel García Jr. also pointed out that breath expenditure during sound production relies on the vocal folds' function. Subglottic pressure is governed by their activity" [Karapetrov, K. Vocal Technique. Sofia, 1990, p. 22]. As subglottic pressure increases during phonation, two effects occur: a) the vibration frequency (pitch) rises, and b) a change in vibration amplitude occurs - intensity (volume). Phonation involves repeating a cycle, consisting of two phases - (passive) opening and closing of the vocal folds, with the opening phase due to increased subglottic pressure, and the closing phase due to the inherent elasticity of the vocal folds (the myoelastic theory in action). A cycle repeats about 100 times per second. This speed is called the fundamental frequency ( $F_0$ ) and relates to pitch. Cycle speed depends on vocal fold stiffness, mass, size, and subglottic pressure. Any change in these factors leads to a change in the sound's frequency.

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<sup>9</sup> Alexander Frederick Matthias – Australian actor (1869 – 1955), creator of an educational process aimed at recognizing and overcoming reactive habitual restrictions in movement and thinking.

The concept of force should be approached cautiously, especially with beginners. While tonal force is determined by subglottic pressure intensity, without using the corresponding impedance, the larynx elevates, and the vocal folds bear a heavier vibratory load, the vocal folds will be engaged in a larger mass of vibration, leading to a significant change in sound quality when transitioning from one register to another. Impedance refers to resistance exerted by the supralaryngeal space against subglottic pressure. In SLS vocal technique, force results from a suitable balance between vocal fold resistance and subglottic pressure, coordinated for optimal balance. Through regular practice and appropriate vocal technique, force increases in line with each student's genetic predispositions. For young voices, a vocal coach should never permit a professional singer's sound to impose on an undeveloped voice. Although singing involves intuition, I believe that at a later stage of learning, students can consciously control the development and strengthening of their singing habits. This can be accomplished through observation/self-observation, listening, and feeling. While self-observation can be useful in the initial stages of training, its effectiveness is partial since it involves the external manifestation of the singing process. This includes the body's position in time and space, facial muscles, and even the larynx's position (placing a hand on the larynx can assess its vertical movement). In my practice, I frequently encounter the following phenomenon - even if a student stands in front of a mirror and tries to relax their lower jaw or adjust the tongue's position, this alone isn't enough to exert control over the process.

### **3.5. Form of the Supralaryngeal Space. Vocal and Speech Modes of the Vocal Mechanism**

The development of one of the most crucial qualities of the voice - its timbral coloring - is tied to and reliant on the establishment and management of the so-called shape of the supralaryngeal space during phonation. By "shape," we refer to the arrangement of specific parts of the vocal apparatus in a defined functional relationship: the larynx's position, the pharynx shape, the alignment of the soft palate and the connected uvula, the tongue's posture, and the facial musculature. As the sound is shaped before leaving the mouth in the main spaces above the larynx, this shape is linked to the phenomenon of resonance. It is displayed by amplifying and changing the initial sound produced by the vibration of the vocal folds. It's essential to note that the vocal sound standard in popular music is close to conversational speech. However, despite similarities in the functionality of the vocal mechanism in speech and singing, there's a distinction between these two sound production modes: while singing, the size of the primary supralaryngeal resonators - the throat, the pharynx, and the larynx - increases

their effective volume. Of course, in nature, two identical throats do not exist; thus, "shape" is a relative concept connected to Individual characteristics of each person's vocal mechanism. Nevertheless, to achieve the desired blended sound of the chest and head resonators, mastering the process of resonance is crucial. This is a challenging task that demands both time and effort. The full-fledged sound of the voice can be achieved by mastering control over the vocal mechanism's shape, sound control, and respiratory support. These three elements of vocal instruction are collectively referred to as "voice placement."

### **3.6. Respiratory Musculature**

The diaphragm is the primary muscle in the act of breathing. It has a domed shape (forming a right and left dome) and separates the chest from the abdominal cavity. It covers the entire area under the lungs, attaching at the front to the xiphoid process of the sternum, below to the lumbar vertebrae (I–IV) and the 12th rib, and laterally to the inner side of the ribs on the left and right (VII – XII rib cartilage). The diaphragm has three large openings through which the esophagus, aorta, and thoracic lymph flow. When contracted, it descends downward, increasing the vertical space of the chest cavity. Simultaneously, it pushes the abdominal organs downward and sideways, resulting in visible distention of the abdominal wall in the lumbar and back region. Contraction of the diaphragm, along with the contraction of the abdominal muscles, increases pressure in the abdominal cavity, creating what is referred to as intra-abdominal pressure.

Other muscle groups are also involved in the phonation process aside from the diaphragm. These are:

- Deep muscles of the back
- Chest muscles around the shoulder girdle
- Deep neck muscles.

The abdominal musculature indirectly contributes to the establishment of vocal support. These muscles include the external obliques, internal obliques, transversus abdominis, and rectus abdominis. I say indirectly because these muscles are primarily involved in the exhalation process. "By pulling the ribcage downwards, the abdominal muscles become the most powerful supplementary expiratory muscles; by stabilizing the lower part of the ribcage, they create the basis for the ribcage's contraction by the intercostal muscles" [Ovcharov, V., V. Vankov.

Anatomy of Man. Sofia, 2012, p. 205]. In other words, these muscles should remain calm but active during inhalation and phonation to ensure the free movement of the diaphragm.

### **3.7. Breathing and Vocal Support**

Breathing is a physiological process that involves the exchange of gases—oxygen and carbon dioxide—in the human body. This act can be voluntary or involuntary. Normally, in everyday life, breathing isn't consciously controlled, as in states of sleep, eating, and others. No one contemplates or tracks its individual stages or how active the respiratory musculature needs to be to provide the necessary energy for specific activities like speaking, sports, or singing. Nevertheless, breathing can be divided into distinct stages. In natural breathing, there are three: inhalation, exhalation, and relaxation. In speaking, inhalation is natural and sufficient to provide energy for articulating a particular phrase. The dynamics and length of the phrase are moderate. Exhalation occurs automatically after the completion of the phrase, followed by relaxation of the respiratory musculature. Unlike natural breathing, singing breathing involves an additional stage and is characterized by the following features: phrasing, dynamics, and consciousness. The stages of singing breathing are four: inhalation, breath retention, exhalation (phonation), and relaxation. Each of the four phases plays an equally important role in the quality of sound production during singing.

### **3.8. More on Breathing**

Breathing is related to body type, and understanding this can be helpful in the methodological work of a vocal coach. In my practice, I observe the way beginner young singers breathe. I consider the physiological condition of the students' bodies. In the early high school years, most boys and girls experience growth spurts, and their bodies are thin and tall. Others are fuller, and some are actively engaged in physical training, which results in a more pronounced musculature. We can distinguish several breathing patterns among them.

The slender individuals tend to exhibit vertical breathing, with little expansion in the chest area. Usually, this verticality is accompanied by pulling in the abdomen during inhalation, and during sound production, you can observe tension in the diaphragm area. Those who engage in physical training also tend to breathe vertically, but there's some involvement of the chest area, expanding upon inhalation. Their abdominal region remains somewhat tense. On the other hand, fuller body types are inclined toward low abdominal breathing. During inhalation, you



can notice a gentle expansion in the lower part of the body, and there is slight expansion in the chest area.

### **3.9. Practical Exercises, Techniques, and Patterns**

The primary exercises I use in my practice are borrowed from the Speech Level Singing technique table. There are 10 exercises that focus on specific functions of the larynx, namely musculature and resonance. Over time, I have also developed a set of exercises suitable and adjusted for different stages of mutation in adolescents. Every vocal instructor is free to choose from existing exercises or create their own vocalizations or exercises to achieve the desired results in working with mutating voices. The tonal volume should always match each student's individual capabilities at that moment. Furthermore, the sequence of exercises should not be chaotic but strictly logically ordered to achieve maximum effectiveness in resolving vocal problems.

In my practice, I conditionally categorize the exercises based on the following criteria:

1. By purpose - for warm-up, for substantial vocal work, for transitioning the voice from singing to a spoken mode.
2. Depending on the stage of mutation.
3. For sound control.
4. For controlling and supporting the airflow.

In the process of mutation, the larynx grows as the musculature fails to keep up with the enlargement of its cartilaginous structure. Due to this imbalance, the voice loses its purity, speed, and quality. Due to the lack of stable vocal support, students (8th - 10th grade) have difficulty with long phrases and maintaining pitch in high tessitura. Therefore, the exercises should have a small tonal range - a third, fifth, up to an octave, with easy melodies. This way, they can be easily memorized by students, turning them into an automatism so as not to introduce additional distraction in their vocal practice. The more complex an exercise, the more concentration is required for its correct execution, first in intonation and then in vocal placement. If, for example, a student must simultaneously monitor the correct intonation, the lower jaw, and vocal constriction in an ascending exercise, they will fail in at least one of the tasks. I've already mentioned that during adolescence, the brain isn't capable of handling two cognitive tasks simultaneously. This will hinder the vocal placement process and only trigger negative emotions and reactions. Therefore, in my practice, I follow the maxim - easy but with more repetitions. The difficulty of the exercises will increase with the students' age and the level

of skills they develop in the educational process. Awareness is individual and follows its own rhythm for each of them. Some will have higher requirements, while others will have even higher ones.

### **3.10. Vocal Methodology Selection**

The primary objective of every vocal instructor is to develop in their students a comprehensive, tonally rich range where each of the registers resonates with its distinctive depth, brilliance, and purity while maintaining homogeneity range. The voice should be agile, lively, and dynamic, enabling the interpretation of various genres such as musical theater, jazz, pop, and rock. Students need to develop qualities such as endurance and strength, sing freely in the high register, skillfully manipulate their timbre, and maintain a high level of vocal culture.

To achieve all this, the choice of vocal methodology is crucial. Vocal instructors face several critical questions such as:

♪ How should one work with young voices to help them successfully transition through the period of change?

♪ Should the voice be adapted to a particular methodology, or should the methodology be suitable for the voice?

Methodology - a panacea does not exist in the world for the simple reason that there is no single standard for sound in today's pop culture. Everyone is free to express themselves in songs based on personal preferences and vocal capabilities. Nevertheless, considering the specificity of the mutating period and the development of a healthy, long-lasting voice, a vocal instructor should rely on the foundational vocal principles:

1. Low abdominal diaphragmatic breathing
2. Gentle tone onset
3. Covering the transition to the upper register
4. Stable breathing support
5. Low larynx position and homogeneous sound through registers.

## **IV. CONTEMPORARY APPROACHES IN BUILDING VOCAL HABITS DURING MUTATION**

### **4.1. Individual Approach and Howard Gardner's Theory of Multiple Intelligences**

The theory of multiple intelligences by American psychologist professor Howard Gardner, published in the 1980s, serves as a useful tool for vocal coaches. According to Gardner, "human cognitive competence is better described in terms such as 'ability,' 'talent,' or 'mental skills,' which I call 'intelligences.' Every normal individual possesses each of these abilities, but people differ from each other in the degree of their abilities and their combination... There are no two people in the world with the same intellectual profile, as it also depends on their life experience" [Gardner, H. *Multiple Intelligences*. Sofia, 2014, p. 16].

Taking this into consideration, a vocal coach should work with each student without expectations or comparisons with other classmates. The pace of development is determined by the student. If they are motivated and encouraged, they will gradually achieve a positive result. Conversely, if only their mistakes are highlighted, they'll lose motivation to work and won't progress quickly. Sometimes external circumstances hinder the collaboration between the student and teacher: depressive states, family problems, personal issues, and more. The vocal coach should recognize these conditions to avoid overexposing negative emotions.

Gardner's theory assumes that a singer needs more than just musical intelligence, responsible for rhythm, text, melody, and reading sheet music, to become a true artist. They need bodily-kinesthetic intelligence to move their body in space and time or express emotions through it; linguistic intelligence for understanding text or language skills; interpersonal intelligence – the ability to notice differences in others, their temperament, mood, motivation, or intentions; intrapersonal intelligence – knowledge of our inner world, our emotional baggage, understanding of feelings, and attempts to explain them. Not to forget spatial intelligence – the ability to recognize shapes, faces, and places in detail, solving spatial tasks and visualization skills. Let's not forget logical-mathematical intelligence. Each of these intelligences is developed in their overall combination. For example, a common combination is when musicians aren't particularly good at math. Or musicians who have exceptional success in visual arts. At the same time, stars of the musical genre elevate several intelligences to a level of perfection – musical, bodily-kinesthetic, linguistic intelligences, and so on.

#### **4.2. The Impact of Music on Brain Function**

Music affects our brain in an exceptional way to the extent that it can alter its structure. This ability of the brain is known to scientists as neuroplasticity. The longer we engage in specific movements or actions, whether they are related to hearing, vision, or motor skills, the more extensive the brain areas responsible for these movements become. This implies that the

brain can be altered by experience. In children involved in music, whether it's playing an instrument or singing, both hemispheres of their brain correlate much better than in their non-musician peers, making them more creative in solving problems of various kinds.

Additionally, when we listen to music, the level of dopamine in the brain increases – a hormone responsible for our sense of pleasure and enjoyment. Another hormone, oxytocin, associated with empathy and trust, also increases its levels. Our sense of pain is lowered when we play an instrument, sing, or collaborate in a group, which in turn reduces the levels of cortisol, a stress-related hormone. Until recently, it was believed that the right hemisphere is responsible for musical abilities. In fact, the brain, when listening to music or engaging in more complex activities like singing, is a much more complex dynamic system in which both hemispheres constantly exchange information, as do their adjacent zones and structures.

In an episode of "Tech Effects: How Music Affects Your Brain," researchers confirm that music influences our thinking, behavioral patterns, and cognition. And of course – emotions. Emotions are the primary instrument through which we perceive, feel, and experience music. Music can calm us, bring us joy, make us cry, or conversely, provoke aggression. But one of the most intriguing things I've learned about the brain's activity is its work during improvisation. This is when we create music that isn't pre-learned but happens in real-time. At that moment, the frontal part of the brain – the prefrontal cortex, responsible for planning and conscious self-observation, seems to "switch off" during this creative process, leaving active the areas for self-assessment and internal observation. It's as if our entire being closes off from the outside world to create something exceptional, personal, and arising from the depths of our musical state of being. Music is a state that transcends age, and we can understand the constructive role it plays during adolescence.

#### **4.3. Brain Structures Directly Involved in the Process of Sound Perception, Control, and Reproduction.**

The formation of habits, in general, depends on the amount of time dedicated to practice and the level of awareness of the student. This means that to acquire and improve singing skills, each student must devote enough time to practice (every day) and do so purposefully and with understanding. Unfortunately, practice shows the opposite; few manage to maintain such a high level of interest in their own development as singers. However, with appropriate innovative approaches, the vocal pedagogue can achieve high results in working with students. These approaches should be in line with the physiological and mental processes characteristic of this

period, specifically the brain's function. My personal observations show that between the 7th and the end of the 10th grade, students have poor control over coordinating external and internal perceptions regarding motor skills. This happens not because there are deficits in the brain's working process, but rather because certain interactions between neuronal networks have certain limitations. These limits stem from the fact that the neuronal connections between the frontal lobe and the back part of the brain are not yet stably established. Also, the informational neuronal networks between the individual structures of the brain directly involved in singing do not correspond at the required speed due to a lack of myelination. This is precisely the reason for slow information processing and imprecise control over motor activity/consciousness in singing.

One of the most important structures of the brain is the cerebral cortex. 'Thanks to it, we can plan, coordinate our thoughts and actions, perceive visual and auditory patterns, and use language' [Stanberg, R. Cognitive Psychology. Sofia, 2012, p. 83]. The cerebral cortex represents the outer layer of the two hemispheres of the brain – the left and right hemispheres. It is believed that the left hemisphere is responsible for analytical and logical thinking, for language and movement. The left hemisphere also explores past experiences to discover patterns. The ability for spatial representations and spatial orientation is in the right hemisphere. It is involved in the practical use of language. It also plays a fundamental role in self-recognition and, more specifically, in recognizing one's own face. Although each of the hemispheres is functionally specialized, they constantly interact with each other through the so-called corpus callosum. For greater clarity, the brain is divided into five parts – associative cortical areas, each responsible for specific functions. These include the frontal lobe, the temporal lobe, the parietal lobe, the occipital lobe, and the limbic system."

#### **4.4. Building of Fundamental Singing Habits During Mutations.**

I would categorize the singing habits into three groups: the first group corresponds to the development of singing habits related to listening to music; the second – the development of singing habits related to the direct action of singing – the learning process; the third – for singing habits related to the development of independence.

#### **4.5. Organization and structure of the lesson. Personal observations and approaches.**

The lesson is a short segment of time in which the vocal teacher and the student must work together to achieve efficiency in meeting their goals. It can be 40 minutes or even an

extended hour, but in this case, we'll discuss the organization and structure of a 40-minute lesson. How the lesson proceeds largely depend on the approach of the vocal teacher. The teacher remains a constant in the educational equation. The variable here is the student—each student is different within every 40 minutes (age, intellectual and emotional profile). The vocal teacher should also adapt based on Multiple Intelligence theory for each new student. To minimize surprises in a lesson, it's beneficial to maintain a unified structure, on the one hand, and an individualized approach, on the other.

1. We always start with breathing and warm-up exercises to prepare the vocal tract and the whole body. The vocal instructor needs an alert student ready to work diligently and with motivation. 10 minutes.
2. Following the "warm-up" is a brief break—1-2 minutes.
3. The core vocal work follows - 10 minutes. Break 1-2 minutes.
4. Again, 5 minutes of vocal work. Break 1-2 minutes.
5. In the remaining 8 minutes, various tasks can be undertaken—reading text or melody, building a phrase, or explaining how the body works in singing.
6. In the final 2 minutes, transition the voice from singing to spoken mode.

Of course, the given minutes are approximate. The duration of each stage depends on whether we're working with a beginner or an advanced student, the stage of mutation, and so on. However, the fundamental structure of the lesson remains unchanged. Attention should be paid to breaks during the lesson. They are like pauses in music. Short breaks in the lesson are like a breath of fresh air for the brain. Afterward, work continues lightly and naturally. If necessary, we can increase their number, but not their duration. The main goal is for the student to leave the lesson with a positive attitude and a desire for the next meeting with the instructor.

My approach in building vocal habits and musicality in singers:

1. Balancing the larynx musculature
  - 1.1 Identifying registers and smoothly transitioning between them.
  - 1.2 Balancing register transitions
  - 1.3 Developing a sense of metro rhythm.
  - 1.4 Correct intonation

2. Developing stable vocal support as a secondary function of the larynx's regulatory work

2.1 Listening and feeling.

3. Colored the entire range – balancing the sound

4. Psychomotor action – the body works for the voice and the voice works for the body.

5. Independent voice work and arranging songs in different genres. Reading musical notation. Self-accompaniment.

### **Conclusion**

The primary goal of a vocal pedagogue is to protect the changing voice during this transformative phase and to smoothly guide it through the period of growth and hormonal imbalance. Preserving the child's voice is a frequently discussed topic, and all vocal instructors share the belief that the student's workload during this period is crucial. To maintain the voice's healthy state during and after mutation, certain guidelines must be followed. The first rule involves employing a gentle teaching methodology. Under no circumstances should the so-called belting be allowed during this time. This can lead not only to physiological problems but even to pathologies, and the student might become utterly discouraged by their "failures," leading to a complete abandonment of further vocal development.

The second rule is associated with the qualification and knowledge of the vocal pedagogue regarding how mutation progresses and what tools and approaches to use in their teaching practices. It involves understanding what can and cannot be done with the changing voice on one hand and what its capabilities are in each stage of its development on the other. This includes different warm-up methods, selecting appropriate repertoires, and defining tessitura.

The third rule is to instill voice prevention practices in students. Prevention is linked to the personal hygienic vocal habits of adolescents. This refers to voice use in daily life and, subsequently, in singing. Most students neglect their voices, they speak loudly, shout, provoked by their unrestrained emotions. The voice tires easily, becomes hoarse, and is ineffective during singing classes. Prevention is directly linked to lifestyle. We know that the best means of voice restoration aren't pills or other stimulants but simply sleep, and in large quantities. During the mutation period, when the entire body is growing, a significant amount of energy is required to maintain its life status.

The fourth rule is communication between the vocal pedagogue and the student. The student has the right to know what's happening with their voice. Good information is a necessity for both parties in education. This will build trust between the learner and the teacher, which will determine the level of effectiveness and the results of their joint work.

Finally, the fifth rule is about proper breathing. Breathing is life. In the book "Science of Breath" by Yogi Ramacharaka, we read that "breathing may be considered the most important of all of the functions of the body, for, indeed, all the other functions depend upon it. Man may live for some time without eating; he may live for a shorter time without drinking; but without breathing, his life may be measured in minutes. Not only is man dependent upon breath for life, but good, rhythmic breathing plays a vital part in maintaining his health and longevity" [Ramacharaka, Yogi. Science of Breath. Sofia, 2001, p. 9]. In vocal work, breathing plays a very important role. The vocal instructor is responsible for carefully monitoring the development of correct breathing habits in students, especially those habits related to sound production.

In this dissertation, I've attempted to summarize and systematize my long-standing work about changing voices during mutation. This topic is subject to future discussions and exchange of experiences with colleagues within and beyond Bulgaria. The more familiar vocal teacher is with the specifics of this process, the better they will manage in their practical work. Thus, voice problems during mutation will be objectively resolved based on a methodically correct and scientifically justified approach. The tasks set by me in the introductory part and their implementation in the text of the dissertation contribute to drawing conclusions and generalizations that bring value to the established topic.

## **SCIENTIFIC CONTRIBUTIONS OF THE DISSERTATION**

1. The process of mutation and the explored innovative approaches are scientifically based and verified in both global and my methodological practices.. Knowledge of the stages of voice change in boys and girls, as described in John Cooksey's eclectic theory, as well as knowledge of registers, make the topic more accessible for vocal pedagogy practice. General parameters and criteria have been derived, characteristic of the changing voice, serving as a starting point in the educational process.



2. Innovative approaches have been proposed to address vocal issues during mutation. Diagnostics serve as an objective analysis of the changing voice's state. For the ease of vocal educators, classification of vocal issues into specific groups based on the physiological changes of the larynx and associated structures involved in phonation has been suggested.

3. A gentle approach and methodology have been proposed in the singing educational process. The developing voice during mutation is an unstable biomechanism in anatomical, physiological, and mental aspects. This necessitates a careful practical approach and the use of specific exercises and vocal techniques corresponding to the current state of the larynx.

4. Cases from my personal practice have been examined. Over several years, I've observed the development of the voices of my students. Each of them has a vocal file in which I record the change in their voice every three months. Tracking each case involves the following stages: a change in speaking frequency without a change in singing frequency. This is followed by a change in singing frequency. Gradually, the voice starts to expand in the low register until established. The newly formed voice still sounds immature, meaning the maturation process continues. Working with the head register does not cease from the beginning of the voice change until its establishment, except for moments at the peak of mutation. The goal is to smooth out transitions and vocalize the entire range in a mixed working mode. Working with timbre.

5. A classification of exercises according to their purpose has been made. Sample lessons with different tendencies to manifesting specific vocal problems have been examined, and a series of logically arranged vocal exercises aiming to resolve them have been proposed. Leading in my personal practice are easily memorable melodies but in different combinations and tonal volume, especially for beginners.

6. The experience of 53 interviewed vocal educators has been summarized. Their responses were part of a questionnaire specifically prepared for this purpose (Appendix IV).

7. The current dissertation is aimed at a broad audience - vocal pedagogues, music teachers, students, and leaders of vocal ensembles in secondary educational institutions who will enrich their methodological practice through a deeper understanding of the process of change in adolescent voices.

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## **SCIENTIFIC PUBLICATIONS RELATED TO THE DISSERTATION**

1. Specifics in the development of the child's voice during mutation. - In: Scientific Conference "Young Scientific Forum for Music and Dance 2017". Abstracts and CD with reports. Sofia: NBU, 2018, p. 29. ISSN 1313-342X
2. Vocal issues during sound extraction and modern approaches to their resolution in the mutating period. - In: Collection "Doctoral Readings." Collection of materials from a scientific meeting of doctoral students from the National Academy of Music "Prof. Pancho Vladigerov." Sofia: NMA, 2018, p. 189 - 198. ISSN 2367-4873
3. Vocal-pedagogical science in support of methodical work with mutating voices. - In: Scientific Conference "Young Scientific Forum for Music and Dance 2018." Collection of reports. Sofia: NBU, 2019, p. 83 - 91. ISSN 1313-342X