DEVELOPMENT AND UTILIZATION OF VIBRATO AND NON-VIBRATO SINGING IN CHORAL MUSIC

by

Kari A. Bragg

An Abstract
of a supporting paper submitted in partial fulfillment
of the requirements for the degree of
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ABSTRACT

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Kari A. Bragg

A divide exists between the choral world and the world of solo voice, making many voice teachers apprehensive about having their students participate in choral ensembles. The root of this concern lies in the use of non-vibrato or straight-tone singing. Many choral directors view non-vibrato as necessary for blend, intonation, and style, but voice teachers see it as contrary to healthy vocalism. However, there are a variety of sources available that lend credence to the use of both vibrato and non-vibrato tones, so long as they are produced in a healthy way. It is the responsibility of the choral director to foster the development of the whole singer and to make decisions based on the vocal health of the ensemble members. The purpose of this study is to aid directors in making informed decisions regarding when and how to utilize vibrato and non-vibrato to produce performances that are historically accurate, musically fulfilling, and vocally healthy.
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APPROVED:

Thesis Chair: Dr. Alan Zabriskie
Thesis Committee Member: Dr. Stella Roden
Thesis Committee Member: Dr. Scott Lubaroff

ACCEPTED:

Chair, Department of Music: Dr. Stephen Moore

UNIVERSITY OF CENTRAL MISSOURI
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Introduction

The phenomenon of the vocal vibrato is not easily explained. Beginning in the 1930’s, Carl Seashore and a team of researchers launched a series of studies regarding the nature and production of vibrato. Their work yielded the following widely used definition of vibrato: “A good vibrato is a pulsation of pitch, usually accompanied with synchronous pulsations of loudness and timbre, of such extent and rate as to give a pleasing flexibility, tenderness, and richness to the tone.”¹

Since that time, many studies on vibrato production have been conducted, yet no definitive answer regarding the nature of its production has been reached. Some believe vibrato is a product of laryngeal relaxation; others believe breath management and support produce vibrato; still others hold that vibrato is directly related to nerve impulses or emotional context. The most prominent views in recent years have come from amalgamations of multiple causes working in conjunction with one another.

Richard Miller suggested that the true answer may lie in a combination of three theories – specifically that vibrato is the result of appoggio technique, relaxed laryngeal function, and neural impulses.² Appoggio technique creates stability through a raised sternum and expanded rib cage, which remain in the inspiratory position throughout a sung phrase. This technique assists the singer with breath management, which in turn works toward the relaxation of the laryngeal mechanism. When the muscles of the laryngeal mechanism are relaxed, they are allowed to vibrate freely with the stable airflow. When vibrato is produced without appoggio

technique or relaxation of the laryngeal mechanism, faults are present. These faults include a too wide, too narrow, too fast, or too slow vibrato and are further manifested by the shaking of the abdominal wall or obvious tension in the neck and throat.  

Miller’s theory went beyond the working together of appoggio, breath management, and laryngeal relaxation to include the role of neural impulses in the creation of vibrato. In support of his theory, he cited a panel discussion from 1983 in which Thomas Shipp indicated that pitch begins with neural impulses communicated to the singer’s vocal folds, and therefore mutations to that pitch, including vibrato, would also have a source in those neural impulses. Though a definitive answer may never be found for the cause of vibrato, these elements working together create a useful, logical explanation.

No matter the cause, it is apparent that vibrato is a natural component of the human voice. In studies performed by Jacob Kwalwasser, vibrato appeared in 27% of tones produced by untrained singers and 93% of those performed by trained singers. Furthermore, it has been demonstrated that vibrato is found even in spoken tones, especially sustained spoken vowels within a dramatic or emotional context. However, this evidence may not be definitive proof that all singing must contain vibrato. The use of non-vibrato singing is also prevalent.

3. Ibid.
4. Ibid.
Many argue that non-vibrato tone, often called straight-tone, is just as natural to human voice production. Both vibrato and non-vibrato vocal production can be seen occurring naturally. The debate is shrouded with conjecture, confusion, and heated opinions. Is it possible that both sides are correct? Could not the human voice – the most complex of all instruments – be capable of healthily producing multiple types of tones? And, if so, could not the informed teacher, conductor, and singer have access to a much wider expressive palette through the use of multiple options for vocal production? This tonal variety is made possible when a proper understanding of the production of both vibrato and non-vibrato tones is reached.

While there are many aspects of vibrato production that could be discussed at length, this study will focus on practical aspects of vibrato that singers can learn to manipulate. Based on an examination of current research, Miller’s three-fold explanation of vibrato production seems the most well-supported and plausible claim. However, the singer can physically control only two components of this explanation. Since neural impulses are not under the conscious control of the singer, discussion of that aspect appears impractical. This study will establish a basic understanding of the production and perception of vibrato in order to better discuss the place of both vibrato and non-vibrato singing in choral music. With this knowledge, techniques for creating a variety of healthy vibrato and non-vibrato tones will be examined. Before vibrato or non-vibrato can be taught, an understanding of the techniques required for their production must be understood.
Vocal Technique and Vibrato

Kirkpatrick noted that in classical singing, the laryngeal and breathing mechanisms must sustain postures that involve muscles working in opposition to one another. This opposition must be balanced in order to achieve proper technique and tone. If one muscle group goes out of balance by becoming too rigid or too lax, the tone quality will suffer. The balance between these two fundamental postures results in good tone quality and vibrato. Sustaining these postures requires activation of muscles, but this must occur without tension – the muscles must remain engaged but relaxed.

Research has demonstrated that during the production of good vocal vibrato, the laryngeal mechanism is relaxed. Some believe that vibrato is the body’s way of eliminating fatigue: vibrato relieves tension. Others believe laryngeal relaxation and release of tension through the creation of an open-throat must occur before vibrato can be performed: relaxation causes vibrato. Whether vibrato is the cause or effect of relaxation or open-throat, many studies have demonstrated that they are directly related.

In a 2003 study, Mitchell and Kenny tested the impact of open-throat technique on vibrato rate and extent. Mitchell and Kenny established three types of sung tones and labeled them “optimal,” “sub-optimal,” and “loud sub-optimal.” “Optimal” represented tones sung with properly performed open-throat technique; for the purposes of this study, open-throat was considered any tone performed with a raised pharynx and a relaxed larynx. “Sub-optimal” tones had varying degrees of closed-throat and “loud sub-optimal” utilized closed-throat with greater

dynamic levels. The results demonstrated that those tones in the “sub-optimal” or “loud sub-optimal” classification were more likely to have an irregular vibrato extent or no vibrato at all. “Optimal” tones with a raised pharynx and relaxed laryngeal muscles had the most regular and pleasing vibrato rate and extent.  

In fact, this connection is so regular that the absence of vibrato is usually seen as a demonstration that open-throat is not being utilized and tension is present.

McKinney stated that the absence of vibrato is usually an indication of laryngeal tension. The presence of healthy vibrato, on the other hand, is not only an indication of laryngeal relaxation, but also of good breath management which works to relieve tension and properly support the tone. He concluded that addressing these issues would help correct most vibrato-related faults. Additional research concerning relaxation and breath management supports McKinney’s claim.

Isherwood noted the importance of relaxation in connection with breath management in the production of vibrato, and stated that vibrato is largely produced by “free contraction and relaxation of the intrinsic muscles of the larynx due to subglottic breath pressure.” Isherwood claimed that good breath management and relaxation of the laryngeal mechanism are intrinsically connected. He stated that the mechanism could not relax without proper support from the breath. When breath support is lacking, the laryngeal muscles will carry tension in an


attempt to support the tone. Thus, breath management not only assists with relaxation, but apparently also helps the singer adjust vibrato.

Large and Iwata also explored the concept that breath management plays an important role in the rate and extent of vibrato. Their study demonstrated that as airflow continued to increase, the intensity of the vibrato did as well. For example, a 10% increase in airflow on average was observed from non-vibrato to vibrato, and the trend continued throughout alterations to the vibrato. However, singers must be careful when adjusting vibrato through airflow to be sure that support is not altered.

While support from the breath should remain constant for all sung tones, the rate of the airflow from that supported position can be altered to modify vibrato rate and intensity. Kwalwasser’s studies showed that vibrato rate increased during a crescendo when airflow was increased. Thus, airflow modification has a direct impact on the intensity of the vibrato within the tone. However, the ability to freely modify airflow cannot be utilized without a firm system of support in the diaphragm and abdomen.

These fluctuations in airflow are not caused by fluctuations in the diaphragm or epigastrium. While pulsations and fluctuations in airflow occur, the diaphragm continues to move steadily and smoothly. It is important to the production of an even vibrato that there is support rather than fluctuation in the breathing mechanism. Support for the tone allows these

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11. Ibid.
modifications; a widely used system of support among pedagogues in the Western vocal music tradition is that of **appoggio**.

The **appoggio** technique can provide a stable system of support that allows for the breath management needed in the singing process. Emmons and Chase define it as:

…a raised sternum and expanded ribs (shoulders remaining low), maintained from beginning to end of the phrase. While the breath is being replenished for the next phrase, nothing should change—shoulders should stay relaxed and down, sternum should maintain easy height, and ribs stay extended. \(^{15}\)

**Appoggio** provides the support needed to stabilize the vibrato and helps create evenness in both pitch fluctuation and rate. \(^{16}\)

In order to reinforce this relationship between **appoggio** and vibrato, Richard Miller considered vibrato in the absence of **appoggio**. He found that vibrato without **appoggio** resulted in a shaking of the epigastrium. This abdominal vibrato created an imbalance in the musculature of the abdomen and caused an unstable vibrato. Abdominal vibrato had uneven pitch fluctuations or manifested itself in a wide, slow wobble. \(^{17}\) Stanley supported Miller’s view, and stated that good vibrato cannot be achieved without the fundamental techniques such as **appoggio** in place. \(^{18}\) Once these fundamental techniques of vibrato production are understood and established, the instructor may delve into the issues of intonation, blend, and stylistic decisions.

Unfortunately, these issues have sparked a debate between teachers of choral and solo singing.

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17. Miller, *Structure of Singing*.

The Vibrato Debate

Despite the mutual desire of both choral directors and private voice instructors to help their students attain beautiful tone, a debate persists as to how this is achieved. Many private voice instructors are hesitant to have their students become involved with choral singing, fearing their student’s voice may be suppressed and forced to match less developed voices. Voice teachers often believe choral singing “promotes vocal constriction [and] limits the healthy growth of solo singing.”19 This belief stems in large part from the tendency of choral directors to restrict the use of the vibrato.

Many choral directors fear use of vibrato will cause faulty intonation or inhibit blend and are concerned that vibrato-laden tone will yield inaccurate stylistic results. Some utilize vibrato in moderation while others block it completely from their ensembles. Many voice teachers believe the use of non-vibrato to be contrary to healthy vocalism.20 Perhaps common ground may be found allowing room for healthy non-vibrato vocalism as well as pitch-centered, well-blended, vibrato-filled choral sound.

Intonation

Perhaps the most common reason given for the elimination of vibrato is that of seeking pure intonation. Many conductors believe that vibrato will obscure the intonation of the group and that, because singers’ vibrato rates do not match perfectly, the pure tone will not be heard. William Vennard writes, “Choir directors began listening to the two pitches of the vibrato,


neither of which is the desired one… So the theory developed that perfect intonation was impossible without a straight tone.”21 Sherburn-Bly further indicates this belief of many conductors, stating that many ask for a simplified, vibrato-less tone in order to improve intonation when tuning chords.22

However, studies of vibrato perception show that it is not the two outer pitches, but the true pitch that is perceived by the listener when vibrato is properly and healthily produced. Furthermore, some research shows that use of improperly produced non-vibrato tone can physiologically cause intonation problems. Many researchers and pedagogues, including Richard Miller and Carl Seashore, indicate that vibrato serves to relax the laryngeal mechanism – vibrato can help keep the voice from tiring. Stark writes that straight-tone is, essentially, the inhibition of the voice’s natural “work-rest cycle.”23 Most voice scientists and pedagogues further agree that vibrato is an indication of relaxed and balanced laryngeal position.

Because vibrato is produced through a relaxed vocal production, it serves an integral role in intonation. Leading voice scientist Ingo Titze stated that pitch is actually stabilized with vibrato.24 This stabilization comes about partly because of the role vibrato plays in preventing and relieving fatigue.25 Additionally, a pitch that is sung with a straight tone may sound correct to the singer, but be perceived as slightly under pitch by the listener. Swan suggested that this

21. Vennard, 206.


may result from a lack of breath energy to support a straight tone. Doscher wrote, “It is better to have a slightly breathy tone with an even vibrato and good focus than a crystal clear, strident sound with no fluidity. The latter tone often sounds slightly under pitch because the air is being pushed through the resonance tract.”

Many writers suggest that pitch problems occur with straight-tone singing because it is impossible, or nearly so, for a purely straight tone to be produced. Ternström wrote that, based on his studies, slight pitch fluctuations are always present in tone production and that vibrato is simply a way to stabilize them. If this is the case, removing the vibrato will not take away the fluctuations, but will simply take away the evenness. When the shifting of the pitch is uneven, the correct mean tone is not heard. Rather than seek to eliminate all vibrato, pitch can still be stabilized when vibrato is altered or limited.

There are ways to limit rate or extent of vibrato in order to reduce its prominence in the tone. However, to strive for an entirely vibrato-less tone will apparently almost always cause more intonation problems and cause fatigue. Healthy phonation is the key to proper intonation. This principle applies to both vibrato and non-vibrato tone. An unhealthy vibrato will result in pitch inaccuracy as much as an unhealthy non-vibrato tone. Reaching proper intonation in our

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29. Titze.
choirs is as simple, or as complex, as achieving proper and healthy phonation. The conductor’s first concern in achieving pure intonation must be the vocal health of his singers.

**Blend**

Of the three primary concerns choral directors share regarding vibrato, perhaps the most subjective is blend. Most directors view a vibrato which is too wide as a vocal fault which will inhibit blend, but some are only concerned by its presence in the upper voices. Some will totally avoid dramatic voices with wider vibratos and some will allow such voices into the bass or alto sections. Howard Swan noted that many directors advocate the idea that a “chorus learns to sing with a beautifully blended tone quality only to the extent that each individual in the chorus consents to give up, to take out, or to submerge a measure of his own sound.”

However, creating a singular group sound by excluding the individual tone qualities of the singers is to severely limit the coloristic capabilities of the ensemble.

Several authors believe that the idea of the individual totally submitting to a “group sound” is an improper connotation to the term “blend” and suggest utilizing different terminology. Galante preferred the term “timbre unification.” This implies the use of adjustments in timbre rather than vibrato or other factors to achieve a unified tone. While “blend” gives the idea of creating a single sound, “timbre unification” allows a wider palette, since the choir can learn to unify and agree on multiple timbre and color options.

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Folger agreed with this sentiment and utilized the terms “chorus effect” and “unification of choral sound” to describe “blend.” Again, the idea of a unified tone allows for multiple colors within the ensemble, utilizing the strengths of individual members. Folger noted that there are approximately seven factors which affect unified tone, only one of which is vibrato. The placement of singers within the ensemble is much more important to the perception of unified tone than is vibrato use.32

Ekholm found that spacing singers farther apart helped them sing more freely and still achieve a unified tone. One common method of finding unified tone is voice-matching, a system made popular by Weston Noble. Ekholm stated that voice-matching allows greater blend as well as vocal comfort and freedom of phonation.33 In a voice-matched ensemble the individual characteristics are still present but are not noticeable. The unified choral sound is governed more by the perception of the listener than the actual vocal production of the singer.34

When the focus of creating a unified tone is the overall perception of the choral sound rather than alteration of the individual’s sound, singers are able to focus on healthy technique. If all singers are producing a healthy vibrato, timbre unification can still be reached. It is only obtrusive vocal faults related to vibrato, such as the wobble or tremolo discussed previously, that would harm the unified sound. Yet, for all the time and energy spent on discussing and achieving blend in the choir, how important is it truly to the audience?


34. Titze.
Ekholm’s research indicates that even “musically sophisticated listeners…may be primarily influenced by musical considerations other than homogeneity of tone.” It was primarily choral conductors and voice teachers who pointed out blending considerations in the study. Since the ultimate concern of the choir is its communication with the audience, and the audience is not as concerned about blend, the requirements for blend held in place in the choir could be relaxed without detrimentally affecting the audience’s overall experience. Instead of seeking utter “homogeneity of tone,” other unification techniques such as alternate seating arrangements could be used to optimize blend and vocal comfort.\(^{35}\)

Stylistic Considerations

To support the use of non-vibrato tone in choral singing, many choral conductors state that this type of tone is essential to the performance practice of specific types of music. Their desire to stay true to the composer’s intentions is certainly an admirable one. However, this reasoning may not always be founded in historical accuracy or in realistic reasoning. The primary sources of contention are the debates over Early Music, especially regarding terminology and the child’s voice, and twentieth-century or modern music.

*Early Music*

The place of vibrato in Early Music has been widely debated by musicologists for some time. Many argue that Early Music must be performed *senza* vibrato at all times. Author Andrea von Ramm even goes so far as to state that the “so-called natural vibrato does not exist.”\(^{36}\) However, others argue that as a natural part of the human voice, vibrato must have been

\(^{35}\) Ekholm, 129.

utilized in Early Music to some extent, if not as fully as it is today. The root of the debate lies in the definition of terminology and in the nature of the child’s voice.

Terminology and the *tremulo*

One primary concern of both camps is the term *tremulo*. If tremulo and vibrato are synonymous, then the writers of the time quite clearly denounce its frequent use. If, however, tremulo refers to an ornament such as the trill, then there is no indication that vibrato was undesirable. In 1649, Christoph Bernhard wrote about the undesirability of the *tremulo*, and many other writers of the time share similar concerns. 37 Dennis Shrock cites authors as late as 1832 denouncing the overuse of the *tremulo* and quotes Louis Spohr’s definition of the *tremulo* as “almost imperceptible to the ear.” 38

However, Bernhard’s writing described this undesirable *tremulo* as that which older people utilize because they are no longer able to hold the note. By connecting this undesirable tremolo with older singers, it is possible that Bernhard is referring to a specific vibrato related vocal fault known commonly now as the wobble rather than denouncing all types of vibrato. 39 Beverly Jerold further supported the idea put forward that these early writings against vibrato are referring to a particular vocal fault. She argued that instruments model the voice, and voices


achieve good tone with vibrato. She stated that “all singing voices vibrate and early sources never suggest repressing this sound unless it is an out-of-tune wobble.”

Major pedagogues agree and research supports the idea that vibrato is a natural phenomenon born of proper vocal technique. Terence Kelly argued that no writings of any time period signify a shift in pedagogical training toward vibrato or refer to a “new and exciting method of continuous vibrato and how to produce it,” indicating that it has likely always been a natural tendency of vocal production. As such, it is likely that vibrato was present in the singing of early musicians and that these texts refer to faults related to that natural vibrato.

Authenticity and the child’s voice

The second primary concern is that of the child’s voice. Many conductors and musicologists argue that treble parts were performed by young boys and therefore would not have utilized vibrato. Valerie Trollinger stated that a pre-pubescent child cannot produce a healthy vibrato because their vocal ligament is not fully developed. However, Barbara Doscher indicated that healthy vibrato can be produced by some children, depending on the culture in which they are taught. For example, children in Austria are taught to sing with vibrato. Miller further supported the idea that children can produce vibrato:

Unless forbidden to do so, children will sing vibrantly. With a child’s voice, as with a voice of any age, the tasks of singing exceed the demands of ordinary


speech. Vibrato is a relaxant principle essential to vocal freedom. Vibrato is held out of sung phonation only through constrictive controls. Miller’s observations are further supported by writers of the time. Many early writings indicate that vibrato was a common factor among all singers, including young boys. In 1619, Praetorius dedicated a chapter of his Syntagma Musicum to the manner in which boys should be taught in the Italian style. He wrote that the nature of the voice must contain certain desirable characteristics, first of which was a “nice, pleasant vibrato.” He went on to indicate that this vibrato was not used continuously in the sound, but was present nonetheless. Furthermore, he criticized those who, "gifted by God and nature with a singularly lovely trembling, and fluctuating or waver voice," utilize excessive embellishments which obscure the text. This may indicate not only that vibrato was utilized in music of the time, but also that it was utilized by young boys. Finding a balance – vibrato in moderation

It is possible that vibrato was not shunned from Early Music, but was not used as continuously as it is today. This idea of moderation is supported by the ambiguity of written sources. This ambiguity may be born of the fact that neither vibrato nor non-vibrato tones were used continuously, but each appeared at various points within a genre or even within a piece. Despite her denouncement of vibrato, von Ramm conceded that the use of vibrato could be appropriate in pieces from certain regions. For example, a French chanson might contain vibrato


46. Jackson.
while an Italian solo madrigal would be less likely to utilize it.\textsuperscript{47} Jackson points out that the use and style of vibrato may depend on the location in which the piece was originally performed.\textsuperscript{48} Further, the use of vibrato may depend on the composer, the text, or the emotional content of a piece.\textsuperscript{49}

As most style elements shift and evolve throughout the history of music, so also has the use of vibrato. The style of vibrato used in a Renaissance piece will not be the same as that utilized in a late Romantic piece. However, to say that vibrato has no place at all in music preceding a certain date cannot be adequately supported. While vibrato may not have been used as continuously as it is in \textit{bel canto} technique, it is a natural part of vocal production. Precluding all vibrato use in a choral performance of Early Music may actually be stylistically inaccurate as well as misleading.

Unfortunately, there can be no definitive end to the debate on vibrato use in Early Music because we lack primary recorded sources and utilize different terminology in our modern discussion. Gordon Lamb wrote that “authenticity is not completely possible and probably not completely desirable, if it were possible.”\textsuperscript{50} The final decision depends on the preference of the conductor. However, practicality must play a role. For example, it is unlikely that a woman could healthily produce the same tone quality as a young boy. Techniques could be utilized to help lead the tone towards the desired effect, but should not override the vocal health of the singer.

\textsuperscript{47} von Ramm.  
\textsuperscript{48} Jackson.  
Twentieth-century and contemporary vocal works

The other primary stylistic concern regarding vibrato lies in the performance of twentieth and twenty-first century music. As with Early Music, it is unwise to broadly preclude all vibrato from all pieces of this stylistic period. However, we have an advantage over Early Music in that we often have excellent resources at our disposal including performances given under the direction of the composer, notes left by the composer, or even the composer himself. Mabry stated:

Many twentieth-century composers have desired that singers produce vibratoless tones and have placed indications in their scores for this technique. However, it is not stylistically valid to state that all twentieth-century music should be performed without vibrato, as some have assumed. Not all twentieth-century music is alike in construction or aesthetic intent; and it should not be lumped together into one genre or style.\(^{51}\)

Non-vibrato tone in contemporary choral music serves primarily as an expressive tool utilized to set off sections or words and give them specific characteristics. Such tones may be inserted without express instruction from the composer, but should be used sparingly for expressive purposes. They should provide color and contrast and should not be utilized continuously unless indicated.\(^{52}\) As with Early Music, the final decision rests with the conductor. The health of the singer should be the primary concern of the conductor, and any tone that is unhealthily produced or any continuation of tone which causes fatigue to the voice should be avoided. Finding healthy ways to produce both vibrato and non-vibrato tones is vital.


\(^{52}\) Ibid.
Developing the Whole Singer

The perception of vibrato plays a key role in listener involvement in the music. Many believe vibrato to be a determining factor in quality of tone.\(^{53}\) Seashore qualified vibrato as providing a “pleasing flexibility, tenderness, and richness to the tone,” demonstrating its effect on the listener.\(^{54}\) He stated that many times listeners do not notice the vibrato within a tone, but simply perceive the vibrato as a part of the timbre.\(^{55}\)

The ear perceives vibrato as vibrancy, ring, and life in the tone. This is caused by shifts in tones and overtones within the vibrato that give the impression of richness and warmth.\(^{56}\) Healthily produced non-vibrato similarly plays an important role in the experience of the listener. It provides a change of color, contrast of mood, and expresses deep emotion or paints a picture. Both have a valuable place in vocal and choral literature. However, if the tone is not founded in good technique, these powerful attributes of vibrato and non-vibrato on the listener’s experience will be rendered useless.

Establishing good, basic technique should be a high priority for the choral director. Zabriskie argued that when basic techniques are addressed before faults arise, students are able to navigate passages with few corrections or with simple reminders from the director.\(^{57}\) Often, developing singers in an ensemble lack the skills needed to safely and consistently create the

\(^{53}\) Stanley.


\(^{55}\) Ibid.

\(^{56}\) Stanley.

desired tone.\textsuperscript{58} Miller stated that “the most efficient vocalism, whether from the solo singer or from the chorister, produces the most aesthetically pleasing vocal timbre.”\textsuperscript{59} For many singers, the choral director is the only voice teacher they will ever have. The burden for teaching this “efficient vocalism” lies on the shoulders of the conductor.

Therefore, the conductor’s role of voice teacher must be realized. The end result of creating and presenting beautiful music through the medium of the choir cannot be attained without the education of the student and the development of the whole singer. Vocal health and growth become the responsibilities of the director. When this is understood, it becomes clearer that the job of the conductor in the rehearsal is not to restrain the ability of the more advanced singers in order to help them blend with the less-developed ones, but to strive for the growth of all singers.\textsuperscript{60} This includes bringing the less-developed singers toward the level of the more advanced in addition to fostering musicality and stylistic understanding. Technique is a key concept to be addressed in the choral ensemble.

Laying the Groundwork

When addressing technique in the rehearsal, it may be advantageous to begin with small portions every day at the beginning of the rehearsal. The technique taught may then be linked to the current repertoire of the ensemble. When concepts are implemented in a logical order, they can easily be linked to one another to assist in retention and application. Beginning concepts should be tied to the students’ existing schemata using normal activities such as yawning,

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\textsuperscript{60} Ibid.
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groaning, sighing, stretching, and typical movements or images. Once these basic concepts are understood, more advanced concepts can be tied to them. Once more advanced techniques are understood, students can be reminded more easily of a specific technique to help them navigate difficult passages.

Specifically, the foundation of good vocal technique will help to establish a wide variety of color options for the choir, including the use of both vibrato and non-vibrato tones. Vibrato is perceived as vibrancy and color for the listener and adds depth to the choral tone. Lamb wrote that “vibrato is an essential part of the life of the tone of a choral ensemble.”\(^{61}\) Simplified tone with lessened vibrato is also necessary for stylistic or musical reasons, but should not be the only resource at the choir’s disposal.\(^{62}\) Healthy vocal production of both types of tone should be fostered to create an assortment of colors which can be utilized in a variety of repertoire.

**Fostering Vibrato**

In reference to vibrato use in the choir, Miller stated that the answer is not to “make solo singers emulate the technical level of amateur voices, but to work for a more efficient production from the less proficient singers.”\(^{63}\) Working toward developing all voices and fostering vibrato in all singers will help attain a wider palette of choral colors. However, vibrato cannot be healthily manufactured; rather it is developed. Swan urged the conductor to be patient, stating that “as the voice matures, so will the vibrato of the singer.”\(^{64}\) As noted previously, research

\(^{61}\) Lamb, 147.

\(^{62}\) Galante.

\(^{63}\) Miller, Solutions for Singers, 58.

\(^{64}\) Swan, 57.
indicates that basic technique such as relaxation, posture, breath support, and appoggio technique help the natural vibrato to develop. In order to foster the development of vibrato, these concepts must be taught and reinforced within the ensemble.

*Relaxation and Posture*

Relaxation and posture are the basis of all other singing technique. Without correct posture in place and relaxed but engaged muscles, many faults will present themselves – foremost of which is the lack of natural vibrato. Especially in the choral setting, students who have not received proper training in posture and relaxation tend to overwork the muscles and will often lock the knees in order to achieve stillness for a performance. Solidifying proper posture and relaxation of the musculature of the body, and particularly the larynx and throat, will greatly help towards developing a healthy vibrato.

Relaxation allows students to free tension that would otherwise inhibit the singing process. In her book, *Group Vocal Technique*, Haaseman utilized a flow chart to show how the proper use of almost every technique in singing stems from the ability to achieve relaxation and proper posture (Fig. 1). Relaxation should be a part of each warm-up in the choral classroom. This may take the form of exercises devoted entirely to relaxation or simply vocalises with movement. Either way, students must be continually reminded to keep the body free of tension.

Fig. 1. Haaseman shows that within the formal choral experience, relaxation is the integral first step toward proper vocal technique.
Relaxation must be achieved before proper posture can be developed. Spurgeon warns that the posture used for singing is not natural, and directors must be especially aware of the singers’ tendencies toward “excessive correction.” This over-correction will often take the singer back to tension in the body and the vocal mechanism. As with relaxation, reminders of proper posture need to be a continual part of the rehearsal until it is solidified with the singers. Because relaxation and posture are so closely related, some authors suggest teaching the two simultaneously. Singers can be taught proper posture for both sitting and standing using stretches that also relax and elongate the body. For example, exercises performed while lying down allow the muscles to relax into the floor while the student experiences the feeling of proper alignment. When the body is properly aligned and free of tension, the focus may shift to breath management -- an equally important aspect of vibrato production.

_Breath Management_

Once the singer has achieved a relaxed but stable posture, the next logical step is the teaching of breathing and breath control. Duane Cottrell’s research reveals that a majority of choral directors instruct their singers to utilize a form of belly-breathing. For many, telling students simply to push out on the belly during inspiration seems the most expedient way to teach breathing. However, belly-breathing locks the diaphragm into its lowest position,

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67. Zabriskie.

causing unnecessary tension. Furthermore, this breathing technique causes the chest to collapse down in order to expel air and reduces the size of the chest cavity.69

The traditional *bel canto* method of singing incorporates the use of *appoggio* breath. As discussed previously, *appoggio* technique allows the muscles of inspiration to work in opposition to the action of the expiratory muscles, creating equilibrium and control in the voice.70 This system of support frees the body to create a steady airflow without excess tension, facilitating an even vibrato rate. Unfortunately, many choral singers have a misunderstanding of breath support, which leads to tension and inhibits the development of vibrato.

Cottrell has found that when it comes to support and breath management, many choral directors have chosen what appears to be the easiest route by simply instructing their students to activate the muscles of the abdomen.71 However, according to Miller, “increased muscle resistance is not necessarily an indication of better breath management.”72 In many cases, increased muscle resistance may simply lead to unnecessary tension for the singers. In classical singing, studies show that both the rib cage and the abdomen are active.73 During expiration, the external intercostals and diaphragm remain contracted to provide resistance to the internal intercostals and the abdominals. This results in a balanced breathing that provides more direct control over the expiration of the breath. Cottrell states, “unless choral singers are made aware

69. McKinney.
70. Smith and Sataloff.
71. Cottrell.
73. Cottrell.
of, and trained in the control of, the muscles of both the abdomen and the chest, this kind of control is unlikely.”

Haaseman adds that singers may find exercises such as laughing or panting to be helpful in learning to activate the diaphragm and the abdominal muscles. It is also important that singers understand the process of breath management and are aware of how their muscles are working. Exercises that involve sustained tones, rather than the more traditional scalar passages, are excellent for voice training and help singers to “concentrate on breath management and tone production” (Fig. 2).

![Fig. 2. The sliding motion of this exercise helps achieve relaxation. Additionally, the vowels chosen and the use of the [n] help find resonance and proper forward placement.](image)

**Space, Resonance, and Placement**

Once relaxation is achieved, posture maintained, and a good understanding of breath management is in place, tension might still return and vibrato might fail if students are not taught how to place the tone for optimal resonance. Just as classically trained soloists must learn to allow their voices to ring to fill a hall, choral singers must learn to create a resonant and spacious sound. Resonance in the choral tone allows for a wide range of expressive and color options and creates an overall beautiful and pleasing sound.

74. Ibid., 54.
75. Haasemann and Jordan.
76. Cottrell, 57.
In his book, *The Structure of Singing*, Richard Miller encourages teachers to be specific and use exact language when expressing the concept of the open throat. Singers attempting to open the throat after an inadequate explanation will often create a swallowed sound or will bring more tension to the vocal mechanism. Rather, space and proper resonance will stem from relaxation of the jaw, lips, tongue, and other portions of the anatomy related to the vocal mechanism and phonation. Work towards proper placement and adequate space can be tied directly to the singers’ study of relaxation during phonation. As research has indicated, achieving the open throat will lend itself naturally to the development of vibrato.

*Additional Exercises*

In addition to continually teaching and reinforcing the concepts of relaxation and posture, breath management, and *appoggio* technique, conductors may actively involve the choir in exercises specifically meant to help foster and stabilize vibrato. Swan suggested utilizing legato scales sung at multiple tempos or vocalises with rhythmic variations. Miller suggested making the voice sound like a “ghost,” utilizing a glissando up and down with a “scary” vibrancy on [u]. When the basic techniques are in place and the focus is not on creation of vibrato, it is more likely to occur naturally.

It is equally important that the conductor not bring attention to the vibrato. Stating that the purpose of an exercise is to develop the vibrato or stabilize vibrato rate will more likely hurt

77. Miller, *Structure of Singing*.

78. Haasemann and Jordan.

79. Swan.

80. Miller, *Solutions for Singers*. 
than help. When attention is drawn to vibrato, students are more likely to attempt to physically manufacture it, leading only to tension and faults. Instead, exercises should take the focus away from the vibrato and place it on movement, agility, or placement and beauty of tone. When the basic techniques are in place, the vibrato will occur.

Correcting Vibrato-Related Faults

Vibrato-related faults are not a reason to remove vibrato totally from the ensemble. When a vibrato becomes obtrusive to the overall texture of the ensemble, that fault must be addressed. Vennard stated that when a tremolo, for example, causes trouble for the ensemble, “the cure for this is either to correct the single voice or remove it from the choir.”

The initial plan of action should be to help correct the fault. In order to correct the fault, it must first be identified.

In Seashore’s studies, three main parameters for judging vibrato were established: intensity, extent, and rate. All three are important to the scientific study of vibrato. However, intensity deals with the mechanical measurement in decibels of vibrato rather than the perception of the tone. Therefore, it is not likely to be utilized when teaching vibrato in a private studio or a choral ensemble. This discussion will focus instead on extent and rate, which are essential to perception of tone and pitch.

Extent of vibrato is determined by the distance of pitch fluctuation on either side of the true tone. Many studies have demonstrated that true pitch is still perceived with a deviation of approximately one quarter-step (one eighth-step on each side of the pitch), to one half-step (one

81. Vennard, 5.

quarter-step on each side of the pitch). Greater deviation makes it difficult for the ear to perceive the true pitch, hearing instead the two outer pitches, while lesser deviation is either unheard or is perceived as faulty intonation rather than vibrato. Uneven pitch fluctuations within the vibrato will also be detrimental to the intonation of the group. The perceived pitch of vibrato lies halfway between the two outer pitches. When a vibrato does not move evenly above and below the pitch, the middle perceived tone will not match the true desired pitch. This will cause intonation problems in both solo and choral singing.

Vibrato rate refers to the number of oscillations per second present in the tone. Seashore’s studies set the parameters for rate that are still in use today: 5-7 pulsations per second with 6.5 being optimal. Other studies have set more narrow parameters, but all fall within Seashore's initial proposal. When rate exceeds these parameters the tone is heard as a tremolo instead of a vibrato. This effect makes the vibrato protrude from the melodic setting. In the choral ensemble, a singer with tremolo will not blend into the ensemble sound, making it difficult to hear a single pitch.

When less than five pulsations are heard per second, the vibrato is perceived as a wobble. When a wobble enters the tone, it is again difficult to hear a single mean pitch. Rather, the two outer pitches of the oscillation are distinctly heard. As with the tremolo, the presence of a

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84. Doscher, “Exploring the Whys of Intonation Problems.”

wobble in the ensemble will protrude from the choral sound and make blend impossible. The instructor must decide the best way to judge and approach these faults.

When it comes time for judgment of a student’s vibrato, it is unlikely that the teacher will take the time to measure the exact extent or rate of the vibrato. If a vibrato is too wide, it will be difficult to ascertain the mean or true pitch; if it is too narrow, it will be heard as a tight shaking rather than the flowing tone Seashore describes. These variations can be heard by the trained ear without use of machinery to measure the exact extent of pitch fluctuation. In the choral setting, these differences will be made obvious in the form of a voice “sticking out” with too wide or narrow of a vibrato extent.

Even though Seashore provided these specific measurements for vibrato, he concluded his discussion stating that the most desirable vibrato is one that “produces flexibility, tenderness, and richness of tone, without giving prominence to the pulsating quality as such.” As a result, while vibrato can be measured acoustically to find the exact rate, extent, and intensity, the most reliable source for judgment is the ear. Prame showed in his studies that mechanical measurements of rate could be faulty, since rate of oscillation can change within each sustained tone. Even when mechanical measurements do provide an accurate assessment of the physiology, it is the perception of the singer’s vibrato that carries the most importance for the teacher’s work.

87. Ibid.
One 2004 study examined the relationship between perceptual judgments on vibrato and actual measurements. Recordings of the performance of a particular passage were examined and judged by multiple pedagogues in two groups and opera aficionados in another with special interest given to quality of vibrato. While the judges in all three groups made similar judgments on the vibrato, they did not consistently match the actual data collected. The writers concluded that this information further supported Seashore’s observations on vibrato perception and stated, “unless the vibrato is inappropriate or obtrusive, the listener does not make fine distinctions about it.”

A pleasing vibrato will not be noticeable, but will simply blend in with the tone quality of the singer. A poorly performed vibrato will be noticeable to the listener and will stick out of the texture of the song. In a choral setting, a poorly performed vibrato will also be noticeable because it will be heard over the texture of the overall ensemble, alter balance and blend, and likely cause intonation problems. Because of this impact on the ensemble, such faults cannot be ignored.

When correcting vocal faults related to the vibrato, it is important to address the causes rather than the vibrato itself. If attention is called to the vibrato, the student is likely to pay more attention to it and alter it consciously. This often results in increased tension and puts the student

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at risk for exacerbating the problem. Rather, the role of the teacher is to recall the fundamental techniques essential to a good vibrato in order to correct these faults.\textsuperscript{93}

In most circumstances, the issue of vibrato faults can be addressed by meeting with the student individually. Addressing the issue privately with the student fosters a good working relationship and save the student embarrassment and further tension. Again, attention should not be drawn specifically to the vibrato but should be paid to the entire singing apparatus as faults are often only a symptom of tensional, breath, or other vocal faults.\textsuperscript{94} Since vibrato faults can have many causes based in faulty basic techniques, it is wise to approach them with a systematic process.

Kemp suggests a simple procedure for dealing with vibrato faults. First, check the alignment of the spine and head and overall posture. Once this is established, work toward loosening the body and releasing all tension by involving the student in physical exercises which will aid in breath support and management. Next, loosen the articulators and re-establish breath support. Finally, alter the airflow to find changes to the vibrato rate.\textsuperscript{95} This procedure is a quick way to troubleshoot and find the reason behind the vibrato fault.

Often the cause of a vibrato-related fault is extraneous tension present in the body. Re-establish proper posture and relaxation and check the \textit{appoggio} technique of the singer to be sure excess tension is not present in the abdominal wall. If the tension manifests itself in the shaking

\textsuperscript{93} Vennard.

\textsuperscript{94} Michael Kemp, \textit{The Choral Challenge: Practical Paths to Solving Problems} (Chicago: GIA Publications, Inc., 2009.).

\textsuperscript{95} Ibid.
of a part of the body, the head or jaw for example, have the singer slowly and smoothly move the affected area while singing a sustained pitch or slow scale.\textsuperscript{96}

Weiss also suggests the use of sustained pitches and slow slides. In his study, he utilized Stemple’s voice function exercises and \textit{messa di voce} exercises to help operatically trained singers control their vibrato and better assimilate into the choral texture (See Appendix).\textsuperscript{97} While this experiment did not deal specifically with vibrato faults, the concept is the same. The exercises showed improved coordination of the breathing mechanism and helped the singers further develop their vibrato in order to be able to control it. The impact would be positive for developing singers as well as those well into their training.

The causes and possible treatments of vibrato faults are numerous and may affect each singer differently. Because of this, Vennard stated that “no vocal problem requires more patience” than correction or development of the vibrato.\textsuperscript{98} Incorrect vibrato is a symptom of a lack or loss of coordination of the \textit{appoggio} and the laryngeal muscles. Correcting or developing vibrato requires establishing or confirming fundamental techniques. This can be particularly challenging in a group or ensemble setting.

Despite this challenge, vibrato faults should not be ignored or dismissed, as they usually indicate a problem with fundamental technique. For example, McKinney suggested that an evaluation of vibrato be one of the first items of a new student’s tone quality that is examined

\begin{flushright}
\textsuperscript{96} Sherburn-Bly. \\
\textsuperscript{97} John Weiss, ”Operatically Trained Singers in the Collegiate Choral Rehearsal,” \textit{The Choral Journal}, 43/1. \\
\textsuperscript{98} Ibid., 194. \\
\end{flushright}
since it will give insight into the instrument. Vibrato faults serve as a key indicator of weaknesses in vocal production and help inform decisions on the focus of the director’s attention. Improving the vibrato of an ensemble member will improve the sound and overall performance of the group.

Fostering Non-Vibrato

Vennard stated that “a cultivated singer [of the Renaissance era] could alternate straight tones and tones with vibrato at will – a useful skill today in fact.” While current research supports that non-vibrato tone is not necessary for continual use in choral music, it is a useful tool and helps create a wider color palette. Tones healthily produced without vibrato can add to the expressivity of a piece of music and can give variety to an ensemble sound. Non-vibrato is certainly of use to the choral ensemble, but should be approached carefully. When considering vibrato-less tone, it is important to note three factors: the reality of the expectation, the development of the singer, and vocal health.

Asking for a straight tone may be an unrealistic request. Sherburn-Bly wrote that it is impossible to create a pure, straight tone. She noted that sonograms reveal that the “vocal tone does not sound without oscillation for more than a few cycles... When singers attempt to hold the vibrato straight, they can only do so for a few cycles of vibration.” Some oscillation of the tone is required in order for the vocal apparatus to function, and attempting to achieve a pure straight tone may simply result in a less even, tension-filled vibrato.

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100. Vennard, 207.
Because of this, many caution against the use of the term “straight-tone.” The connotation of a tone that is straight will often result in the singer attempting to hold the tone through extraneous tension, which will cause the pitch to go sharp, or through weakened support, which will cause the pitch to sag.\textsuperscript{102} Some opt for terms such as “non-vibrato,” “simplified,” or “simple tone.” Such terminology connotes a shift in tone quality and timbre rather than an act of the body or musculature.

Secondly, the development of the singer must be considered. Asking for non-vibrato too soon in a singer’s development may be detrimental to the overall development of their voice and inhibit the development of a natural vibrato. Doscher expressed her concern, stating that if a singer is asked to employ the non-vibrato too soon or too often, the voice may never “regain its former ‘bloom.’”\textsuperscript{103} Daniel Hoiness expressed similar concerns, stating that vibrato management is a difficult concept when working with untrained voices. He wrote that “students who come up the choral route know control before they know vocal freedom, and in most cases I suspect they never do experience the freely produced, freely supported tone.”\textsuperscript{104}

\textit{Freedom, Relaxation, and Support}

It is imperative that singers establish free phonation in order to be able to successfully navigate the much more difficult task of creating a healthy non-vibrato. Edwards expressed his concern that asking for “straight-tone” requires “developing singers to take on a habit of locking their larynx in an unhealthy, high position.” He further stated that professionals know their


\textsuperscript{103} Doscher, \textit{Functional Unity}, 239.

\textsuperscript{104} Olson, 563.
voices well enough to control vibrato, but young singers do not. They must learn the skills and techniques before they can complete the task.\textsuperscript{105}

When seeking to foster the development of a simple, non-vibrato tone in the choral ensemble, it is important to ensure that vocal health is always a top priority. One must be careful to utilize terminology that will not create tension in the singing apparatus. Mabry suggests utilizing imagery, such as picturing a wavy line as you sing vibrato, then a straight line as you sing without vibrato. Another suggested exercise includes singing a five-note descending scale with vibrato on each note, then without, then alternating vibrato and no vibrato within the scale (See Fig. 3).\textsuperscript{106}

![Fig. 3. Sing the descending scale picturing a wavy line, with relaxed and vibrato-filled tone. Relax for two beats, inhale for two beats, then repeat the scale with a relaxed, non-vibrato tone.](image)

Most importantly, Mabry noted that non-vibrato is based in the same technique as vibrato. Mabry wrote:

“Sing straight tones in a normal, well-supported, subtle, floating manner, never yelled or harsh. Mental and physical relaxation are essential to the production of this technique…As with normal vibrato production, the volume of nonvibrato singing should never exceed that which can be comfortably attained through natural resonance and coordinated, balanced breath support. Any attempt to physically force the voice to project beyond its natural limits can result in vocal fatigue. Repetitive attempts to sing in

\begin{footnotes}
\item[105] Edwards, 36.
\item[106] Mabry.
\end{footnotes}
a tense, forced manner can be detrimental to vocal technique and health, whether one is using vibrato or nonvibrato.\textsuperscript{107}

Most tension present in non-vibrato singing arises from the feeling that the basic technique is somehow different from that used in vibrato singing. This is not the case. The same relaxation, posture, and support are necessary for all types of singing. A low, deep breath without shifting the laryngeal position should precede all non-vibrato singing. When singing non-vibrato tones, more air and more support are necessary. Students should be encouraged to breathe more frequently than would be necessary when producing tones with vibrato. In some cases, a breathier production should be allowed.\textsuperscript{108}

\textit{Planning and Communication}

When using non-vibrato tone, a smaller dynamic and pitch range will be available. Tones should be soft, but not held back. Vowels should be modified sooner on the scale and caution should be used when continuing non-vibrato tone into the upper and lower extremes of the range.\textsuperscript{109} Most importantly, vocal health should be stressed at all times and students should feel free to communicate with the conductor if they feel fatigue or discomfort. While the conductor should watch for these things, students should also know that they may rest their voices if they feel the need.

In addition to this communication, non-vibrato tones in performances and rehearsals should be carefully planned. Understanding that non-vibrato tones cannot be produced with as

\textsuperscript{107} Ibid., 46.

\textsuperscript{108} Sherburn-Bly.

\textsuperscript{109} Ibid.
loud a dynamic level and cannot be utilized in the extremes of the range or for long periods of
time, conductors should plan when to use vibrato and when to use non-vibrato within a piece and
within a rehearsal. Periods of vibrato use should be allowed in order to help rest and relax the
vocal apparatus. Conductors should also consider that the voice must be sufficiently warm
before engaging in non-vibrato singing. Thus, they should not plan pieces that utilize non-
vibrato at the beginning of the rehearsal.  

**Conclusion**

Even though research in the field of vibrato has increased throughout the last century and
many have written on the subject, the phenomenon still seems to evade physiological explanation.
No definitive plan of teaching vibrato can be established. What exists is the result of guesswork
and informal experimentation by pedagogues throughout history. Beyond the act of vibrato, its
place in the art form of music now and throughout history is shrouded in conjecture and opinion.

Because such a variety of conflicting information exists on vibrato, it can appear daunting
to deal with its production in the voice studio or in the choir. However, if one examines only the
aspects of vibrato which can be controlled by the singer, the information becomes much more
manageable and the topic can be more easily approached. Furthermore, it is important as an
instructor to not become overwhelmed by precise measurements and a plethora of data regarding
exact rate and extent.

While the guidelines established by researchers over the years for exact rate and extent
have their place and are helpful in our understanding, Seashore’s ultimate answer provides an
excellent guide. He argued that instructors should trust their ear and perception and decide

110. Ibid.
simply whether or not the vibrato is obtrusive to the sound.\textsuperscript{111} Once this decision has been made, they can approach the fundamental technique of laryngeal relaxation and breath management through \textit{appoggio} technique to correct faults that exist.

Through a study of opinions espoused on both sides of the vibrato debate, one thing becomes clear–there is a place for both vibrato and non-vibrato singing in vocal music. Since the primary responsibility of the choral director is the vocal health and development of his singers, teaching and fostering the development of both types of tone must take place in the choral ensemble. Good technical habits must be established in order for vibrato to be developed. It is not until healthy vibrato has been developed that the conductor should consider the use of non-vibrato or limited vibrato tones in the choir.

When non-vibrato tones are introduced to the choir, it is imperative that the conductor carefully plan the rehearsal, exercises, and use of terminology to avoid the creation of tension. The same techniques established to develop a healthy vibrato must be continually enforced in non-vibrato tone. Communication lines must be open between the student and the director. Once healthy production of vibrato and non-vibrato are in place, then the conductor may begin to concern himself with in-depth musical and stylistic considerations that specifically impact this area of tone production. The choral director’s responsibility to the vocal health of his singers must come first. Establishing and utilizing both forms of tone production will assist in creating a beautiful color palette with a wide variety of expressive options.

\textsuperscript{111} Seashore, \textit{Psychology of Music}. 

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---. *The Vibrato*. Iowa City: University of Iowa, 1932.


APPENDIX

EXERCISES FOR DEVELOPMENT OF VIBRATO AND NON-VIBRATO

1. Slowly sing this vocalize with a legato line on [u]. Pay careful attention to relaxation of the vocal mechanism and expansion of the ribs. Take breaths as necessary, ensuring that the final cut-off occurs on the breath.112

2. Focus the attention of the singers on ribcage expansion and purity of vowels as they move slowly through the following vocalise. Once a relaxed, vibrato-filled sound is achieved, try switching between vibrato and non-vibrato. Ask students to begin the vocalise with a dark tone, and then brighten the tone as they reach the final cadence. This shift in tone quality will help minimize the vibrato apparent in the tone.113


113. Albrecht, 104.
3. Move slowly through these vocalises using [nu] or [no]. Focus on relaxation throughout and expansion of the ribcage.\(^{114}\)

4. *Messa di voce* exercises are helpful in developing awareness of dynamics, but may also be used to help develop vibrato. Increased vibrato rates often accompany a crescendo. It is important to focus on relaxation and expansion throughout this exercise. Take breaths as needed, but attempt to complete one full measure at a slow tempo before breathing. Be sure each note is cut-off cleanly on the breath.

5. Relaxation is key to vibrato production. When the voice slides, it is easier to release control and to achieve a relaxed laryngeal position. If students are struggling with releasing on the slide, go immediately to the slide instead of holding the bottom note. The goal of this exercise is to find a relaxed sound on the top note of the slide. Once this is achieved, slow down the slide. The slide will contain non-vibrato tones. Analyze the feeling of the relaxed non-vibrato and the relaxed vibrato. Discuss how they are the same and how they are different.\textsuperscript{115}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{vibratoExample.png}
\end{figure}

6. Sing a descending scale slowly on [nu] or [no]. Ask students to imagine a wavy line the first time they sing the scale. Sing with full breath support, relaxed and supported posture. Then, take a deep breath for four counts and sing the scale again. This time, imagine the sound going down a straight line coming from between their eyes. Help students keep all basic technique the same for both descending scales and feel the similarities between the vibrato and non-vibrato tone.\textsuperscript{116}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{descendingScaleExample.png}
\end{figure}

\begin{flushright}
\textsuperscript{115} Zabriskie, 57, 35. \\
\textsuperscript{116} Mabry
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