THE ANALYSIS OF FLUTE VIBRATO TECHNIQUE AND DEVELOPMENT TRAINING METHODS

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Abstract

This academic article mainly analyzes a flute technique, vibrato technique, its origin, history, development, and current views on flute academics. The authors of this article provide scholarly analysis and critical discussion of these ideas and information, then use case study methods to demonstrate and explain them. The above description of the vibrato technique forms this article's first part. The second part is the training method for developing a vibrato. In the second part, the author mainly focuses on how to flute teachers should teach and train vibrato and integrate vibrato into flute timbre for flute stage performance. Some cases are used to prove the scientific effectiveness of these teaching methods. This academic article is more from a theoretical point of view, critically summarizing and analyzing the knowledge and theory of flute vibrato technique and vibrato teaching.

Keywords: Flute; Vibrato technique; training method

Introduction

The Vibrato technique is not considered a basic technique like the finger or staccato technique. Many flutists regard it as an advanced technique, and sometimes the vibrato technique is rarely mentioned in performance discussions. The author's first arguments on the vibrato technique are as follows, proper use of vibrato can promote flute performance and improve expressiveness. The second argument about vibrato is that among several different types of vibratos, timbre and intensity vibrato have more effect and are both widely used. In the

second section of the article, vibrato teaching, and training methods, the author will provide rich theoretical knowledge and effective training methods and give some examples to prove it. Two powerful arguments have been concluded. One is that good vibrato can be formed spontaneously for a small number of people, while most people need systematic training to master it. Second, vibrato training is mainly aimed at the training of the larynx and diaphragm and is closely related to the practice of breathing techniques.

Vibrato is the modulation of the flute's tone, making it rise and fall. The goal of the flutist is to control the amplitude (high and low pitch) and frequency (or speed) of pulsation. If the vibrato is too wide or too slow, it may resemble shaking; if the speed is too fast, it will appear to resemble a goat barking. Vibrato is not simply added to the pitch of the flute. It should be an integral part of the tone. The vibrato should be played by the nature of the music, not something that is imposed on the music. If used properly, vibrato can give flute players a wider range of expressions, increasing diversity and nuance (Bayley, 2006). Vibrato technique is easy for some students to master, but it is very difficult for other practitioners and can be called a technical barrier. This is a technique that was not widely used until the 20th century. With the thorough acceptance of the Bohm flute system, vibrato became more common. The vibrato has certain regional characteristics and developed into the basic color of today's flute tone (Wye, 2014). Therefore, the author believes that using the flute vibrato technique is worthy of in-depth discussion and analysis and developing teaching flute vibrato requires a special training program.

The Origin and Historical Development of Flute Vibrato

Documents and data on flute vibrato show that the history of flute vibrato can be traced back to the 18th century. This does not mean that flute music has no vibrato before the 18th century. It is just that since the 18th century, flute vibrato began to be standardized. And it was gradually valued by performers and educators and gradually refined the theoretical knowledge about vibrato. The ancient flutes before the 18th century differ greatly from today's flutes. The flute has also undergone a series of evolutionary processes. The evolution of vibrato technology is constantly improving and sublimating with the evolution of the flute.

Various improvements have been added to the flute since the Renaissance. Early flutes had no buttons. The Renaissance flute was extremely simple in construction, consisting of a cylinder with a mouthpiece and seven finger holes.

In the second half of the 17th century, flutes with cones and single keys began to appear. With this mechanism, almost all semitones can be played on the flute. Today, this instrument is known as the "Baroque Flute". German Theobald Boehm created a revolutionary new type of flute in 1847. This flute has a metal tube with many buttons attached to it. The interval between notes is variable. Boehm's instrument was a huge improvement and overcame the shortcomings of the previous flute. With his major innovations, Boehm can be called the founder of the modern flute.

According to some historical records, the vibration of flute performance before the 18th century was only related to the fingers, which is called the tremolo. The vibrato we are talking about today was not recognized or considered redundant at the time. Here's what composers and flutists of that era said about the use of fluctuating notes. Doing this will not produce great results but rather a whimpering sound. Anyone who does this ruins his performance because he loses firmness and therefore cannot maintain a pure tone, and everything shudders from his chest (Manning, 1995).

Vibrato was not a normal play part in the 19th century. Some flutists began experimenting with vibrato in the late 18th century but encountered some resistance, and the debate continued into the 19th century. In 1830, James Alexander described three methods of producing vibrato:

1. Breathing by shaking or wheezing
2. Shaking the finger over the hole immediately without touching the instrument
3. By vibrating shake regularly on the notes

Both types of breath and finger vibrato are mentioned here, although Alexander does not express a preference for either type. How exactly is breathing vibrato produced? German flute player Maximilian Schwendler played an important role in this discussion. He was one of the first to announce that the larynx initiated the breath vibrato. His point of view can be summarized as the following theory. The player produces vibrato through body organs. The very soft squeeze of the vocal cords and the minimal closure of the glottis necessary for the vibrato produce enough resistance to compress the air column lungs generated by the vibrato and to some extent reshape it into a firmer and denser consistency, to make the sound stronger and reveal more inner power.

The physical study of vibrato dates to the mid to late last century. Christopher Weait (1988) used X-rays and videotapes on the throat while playing the flute and established the direct influence of the throat muscles on flute playing. In 1963, Gartner began experimenting with electromyography to record the electrochemical responses of twelve flutist muscle groups, proving that the vibrato of the flute is not produced by the independent movement of a single organ. In Denton, Texas, USA, in 1986, an otolaryngologist worked with Professors Charles Veazey and Mary Karen Clardy of the University of North Texas School of Timber Management. Many physiological functions have been investigated using fiberoptic laryngoscopes connected to video and audio recording devices (Manning, 1995). These experiments using advanced medical equipment and imaging reveal the principles of vibrato. The above medical and physiological studies of flute vibrato establish that flute vibrato is produced by the combined action of the larynx and diaphragm.

Literature Review

Vibrato Effects Flute Performance: Appropriate use of vibrato by players can promote flute performance and improve flute musical expression. The premise of this argument is that the use of vibrato must be appropriate, and the application of vibrato must be determined and adjusted according to the style and period of the playing content. At the same time, the performer must also ensure that the high-quality vibrato is played. The speed and amplitude of the vibrato must respond to the requirements of the music.

The correct vibrato must be a good fit between the diaphragm and the throat. Some experts use diagrams to explain how to quantify a good vibrato at the different pitches of the flute. The author summarizes good vibrato as including but not limited to stable and uniform regular vibrato, which is often only the most basic. Using vibrato requires good music appreciation skills, and after historical and aesthetic music analysis, it is important to evaluate the possibility of applying vibrato to each piece of music. To do this, the player must choose the type of vibrato that best suits the piece's characteristics (Streitova, 2020). Many scholars expressed similar views to Streitova, that good flute vibrato needs to be analyzed in specific musical works, and the performance of vibrato must be suitable for and respond to the corresponding musical works.

Many flutists have a vibrato defect, which can have a slightly negative impact on performance. There are two main aspects to the vibrato defects in flute playing. One is that the sound can only be blown flat and cannot be used for vibrato processing, and the other is to create irregular jitters (Pang, 2019) blindly. The defects of vibrato technology have affected flute learners' expressiveness in performance, especially in the classical period. It isn't easy to express some of the composer's ideas if a flutist can't play excellent vibrato. Playing some lyrical music passages with a long and flat playing style instead of vibrato technology will make the whole performance lose color and emotion. The best vibrato vibration frequency should be 4 to 7 times per second. Depending on the performance of the music, the frequency and amplitude of the vibration will change with the changes in the music, but too fast or too slow will make people feel uncomfortable. The vibrato should be harmonious, comfortable, and natural (Xiong, 2020).

One of the best ways to improve every aspect of our flute performance (especially vibrato) is to listen more sensibly to the recordings of past and present greatest players. Learn to listen intelligently and critically to multiple aspects of each performer. The main obstacle for flutists when playing vibrato is successfully connecting the moving notes in the piece. It takes real effort and understanding to vibrate naturally on fast-moving eighth notes. Paying close attention to a good violinist or cellist will help flute practitioners better understand the use of vibrato. Because many experts agree that flute vibrato has never been like string vibrato, vibrato is so creative and fluid that players judge exactly when to use vibrato and when not to. The best players are very good at connecting notes with smooth, uninterrupted vibrato. Another major difficulty with vibrato is negotiating intervals smoothly. Most people tend to change the support system and stop the vibrato when the player is trying to get the target note in a clean way, which will destroy the coherence of the music.

The author believes that the most important period of vibrato technique is the period of classicism and the transition to classicism. This is because the vibrato technique of this period is very characteristic, and the use of the vibrato technique in the key passages of these works is extremely necessary for many of the very famous works composed by the composer. The absence of vibrato cannot be tolerated in the performance of these works. The use of vibrato in Baroque works is highly controversial compared to other periods, and flutes used in the Baroque period differed somewhat from later flutes in structure and tone. So today's flutists are very cautious in their use of vibrato techniques while

at the same time playing sonatas from the Baroque period. However, the style of modern flute works does not have a strong melody, and the connotation is more difficult to understand, obscure, and difficult to understand. Many works include re-creations of performers. The vibrato technique is rarely used and mentioned in modern works.

Various Categories of Flute Vibrato

There is no uniform standard classification method for the categories of flute vibrato in the academic world, but players can flexibly divide it according to their needs. For example, it can be distinguished by the amplitude of the vibrato, the frequency of the vibrato, and the speed of the vibrato. Common types of vibratos are intensity vibrato, timbre vibrato, etc. Among them, timbre vibrato plays a larger role and has the most extensive practical application.

The application of timbre vibrato techniques can be subdivided into flute vibrato in solo and symphony orchestras. The author expects to be represented by two famous concertos in the G major concerto K.313 and D major concerto K.314 composed by Mozart, the most typical composer in the classical period, for the flute. About these two concertos, almost all flutists today admit that everything on the score, including the vibrato, should be played strictly in a classical manner. In 1985 Donald, principal flutist of the Chicago Symphony Orchestra discussed the use of vibrato in Concerto K.313 in a master class, where vibrato brought the movement of the melody line to a climax. Endsley, the principal flute player of the Denver Symphony Orchestra, constantly reminds her students to guard against excessive use of vibrato. Avoid using vibrato on moving sixteenth notes, lest they sound unnatural and unstable and affect the rhythm. Endsley emphasized that by summarizing the important notes, the vibrato was constructed sequentially from intense to climax and then suddenly returned to a simple, pure sound. (Ribelin, 1987).

Timbre vibrato has been used since the classical period to highlight important notes in a phrase or to outline beautiful melodic lines. This has a certain connection with the transformation of the structure and material of the flute. The flute is made of silver or other metals improved by Bohm. These metal materials differ from the wood materials used in the Baroque period. They respond sensitively and quickly to vibrato, while the wooden flute has a very limited range of vibrato perception. This creates good conditions for the wide use of vibrato in flute works. Walfrid Kujala, a flute professor at Northwestern

University in Chicago, reviews the theme of the D major concerto on the use of vibrato. Players try to use vibrato on more notes, giving melody energy and continuity. The key concepts of timbre vibrato are moderate speed and depth, and the vibrato technique must be used carefully and controlled.

Kincaid, a flute professor at the Curtis Institute of Music, believes that every flutist should follow certain rules and logic when using vibrato. These appear to be influenced by Taffanel's ideas. He also pointed out how vibrato affects the intensity and scale of notes in music, which is important for flutists in orchestras. Here are his opinions on vibrato, which is also related to relative strength considerations. The rate at which the vibrato pulses can tell a lot about where the notes are on the scale. A slower vibrato indicates relaxation in the lower register, while a faster speed enhances the excitement at the top. In other words, the vibrato rate should gradually pass through the range of the instrument as we gradually increase its intensity. In general, the use of vibrato needs to be done with considerable caution, as the wrong use of vibrato can sometimes damage the continuity of the melody. Occasionally, rapid tremors of consecutive eighth and sixteenth notes add to the rhythm's dynamism. Quick vibrato can be used to lightly emphasize the notes of the skeleton in the modified image, or pulsating changes can make the music subtle and expressive. In other words, the uses of vibrato are varied and unlimited.

Timber and intensity vibrato is essential in ensemble music, and they are carefully coordinated with all the other instruments in the ensemble. The reason is that some woodwinds use vibrato-less frequently, while clarinet hardly uses vibrato. Each woodwind must be controlled to mix properly during the ensemble (Toff, 2012). The speed of the vibrato needs to be relative to the tempo of the music; the vibrato in Allegro should be faster, and the vibrato in Adagio should be slower. Ideally, every choice of orchestra or ensemble should agree on a vibrato style. Only a single instrument with a machine cluster or heartbeat vibrato can disrupt the harmony and disturb the tuning of an entire section. Sometimes every player in an orchestra feels that his vibrato is the best and doesn't want to mix his voice with the other members. As Moyes revealed to us, there must be constant communication within an orchestra and what type of vibrato should be used by each member. Communication also means listening to each other very carefully. Also, in an orchestra, there is no absolute right or wrong way to deal with vibrato. Instead, collaboration is necessary or needs to be discussed ahead of time rather than an occasional feeling-based ensemble.

Modern flutes produce strong vibrato but very little pitch fluctuation. Fluctuations in pitch usually cause this during the ascent due to manipulation strength. The intensity of the fluctuations begins to diminish after reaching a peak, and in the process, the flute's timbre also changes slightly. Howell, in his theory, emphasizes the relationship between intensity vibrato and timbre vibrato. When playing vibrato, the timbre is at the intersection of sharp and flat, combining brighter or darker timbres with intense vibrato. Brighter sounds are usually achieved by playing vibrato, opening the mouth, and directing the airflow down to compensate for the resulting sharpening of the tones. Darker tones are produced by rolling the flute in and blowing it up. The vibrato emphasizes this difference.

Teaching and Training Vibrato: Many students think that the vibrato technique is confusing because of the actual situation of the author's teaching. Some of them are afraid and disgusted with playing vibrato. While not all students avoid the vibrato technique, some students practice vibrato spontaneously, but they produce very irregular sounds. Even some flute teachers cannot articulate the specification and teaching of vibrato in their teaching. They were hesitant about the vibrato part when teaching, and the descriptions of the vibrato theory were vague, without proper language, and just wanted the students to experience the vibrato. The best time to learn vibrato is when the student has several years of study experience and has better control of the larynx (Qian, 2006). In China, the theory and practice of applying vibrato teaching to flute teaching are also active. The opinions of these experts and scholars enable the author to understand the current situation of application in flute vibrato teaching in our country, as well as the achievements and shortcomings.

Professionals at various institutions have their own opinions on teaching flute vibrato. Some scholars believe that the vibrato on the flute cannot be taught, and individuals need to understand the main points through the accumulation of learning. In actual teaching, a small number of students can learn by themselves without a teacher and master the essentials through learning and imitation through relevant professional audio materials. However, most students still need scientific learning and training to master this skill (Ma, 2014). Xiong Li, a flute education expert, believes that breathing training should be done before vibrato training. There is a strong correlation between controlling breathing and completing vibrato, followed by training the diaphragm and then training in music perception and inner hearing (Xiong, 2020). Through such

training, improve the control ability when playing flute vibrato. Make the airflow pressure, speed, and volume more stable, and use the reaction force formed by the diaphragm and the abdomen to push back so that the airflow column produces a stable and regular alternating wave of strength and weakness.

Results

The authors argue that flute teachers should not introduce too much vibrato to their students until they have solid practice in other basic skills and can maintain a good sound for the long notes. Generally, teachers will try to recommend this technique after students have played for a year or two, based on their progress. So far, students have mainly played pure tones, but adding this technique to their performances, will help them gain musical abundance and maturity. Trills should initially come from the diaphragm, such as laughter or gasping. Teachers can suggest having students say "haha" and bring them closer together. Once you get the hang of it, the vibrato becomes natural and smooth and doesn't feel like a mechanical pump. Students started playing vibrato several times per second as a proven method, which required a certain number of vibrato cycles per beat. The advantage of this method is that students can control the speed of their vibrato and roughly know its frequency.

To sum up, the teaching of vibrato skills should not appear in the early stage of flute teaching. Still, the learner must master breathing skills, long stable notes, and have enough control ability and certain performance experience before vibrato. If the flute teacher doesn't do this, the quality of the vibrato cannot be guaranteed, and it may even hurt the flute playing.

Discussion

In response to the author's first argument, proper use of vibrato can facilitate performance and enhance the expressiveness of flute music. If the flutist can't play great vibrato, it's hard to express some of the composer's ideas. Playing some lyrical passages with a long, flat playing style instead of vibrato can make the whole performance sound bland and mediocre. Many flute educators do not recommend trying the vibrato technique in the first few years of flute learning. Still, if the learner has reached a certain level, mastery of the vibrato technique has a great impact on the quality of flute playing. Especially when playing concertos and sonatas of the classical period, if the vibrato

technique is rejected or the vibrato is played incorrectly, the quality of the performance will be greatly compromised, and the intentions and emotions of the composer will not be expressed.

However, inappropriate or excessive use of vibrato can also have negative effects. For example, composers of the Baroque period did not speak of vibrato as a common expression, and the use of vibrato in these pieces had to be done with great care. Sometimes the addition of vibrato can be excessive.

This article's body part discusses the different types of vibratos and how each vibrato classification applies to performance. Among them, timbre and intensity vibrato play a relatively large role and have a relatively wide range of applications. But over time, the two types of vibratos that were most commonly used in flute performances during the classical period became less prominent than they used to be. A likely reason is the technological demands of modern flute expansion with the advancement of technology and the diversification of modern new repertoires. The role of vibrato technology is often combined with other expansion techniques, rather than appearing alone, especially in some extremely fast music, the definition and requirements for vibrato are not so strict.

It is undeniable that vibrato can develop spontaneously for a small number of players, and some talented performers seem to have mastered this technique by nature. However, for most flute learners. The development of vibrato technology requires a period of systematic learning and training. As for when to use vibrato and how to best integrate vibrato into performances, flutists need to accumulate a lot of playing experience and have enough understanding of the background of the repertoire to make correct judgments. From a physiological point of view, vibrato training is training for vibration of the laryngeal and diaphragm muscles. And the acquisition of vibrato technology is closely related to breathing and other skills. However, there are also situations where the learner has already undergone good breathing training, but the vibrato still sounds unnatural and outside the performance.

For the two case studies on vibrato training methods mentioned in the article, the authors carefully analyze two textbooks or manuals by Qian and Trevor Wye, which have different focuses. Wye focused on vibrato-based consolidation and phased improvement training, which is very theoretical. The point of the money is a combination of vibrato and musical performance with better utility. At the same time, Qian also considered the combination of vibrato training according to China's national conditions and characteristics. This is very

worthy of our serious consideration and study. They all provide a basis for researchers to write and innovate flute vibrato training methods and refer to some flute tutorials and textbooks on the market. Relatively few of them mention vibrato teaching methods. This has led flute teachers to incorporate some individualized instructional elements into their practice of teaching vibrato.

Conclusion

The definition of vibrato is relatively vague, and there is no specific concept. We can understand it as a trembling sound that manifests by smoothing pitch fluctuations, resulting in intensity, timbre, resonance, and treble changes. Vibrato is one of the most important skills in flute playing. It is an important means of expressing emotions. It not only reflects the connotation of musical works but also shows the level of flute players. The vibrato is more pronounced in flute playing, and the player's range of motion is relatively large. This unnatural sound requires scientific control by the player to achieve a vibrato effect. When playing vibrato, the player must compress the gas stored in the chest cavity according to a certain rhythm and produce the vibrato through the changes of breathing, lips, and fingers. Under normal circumstances, vibrato is produced under the alternating movement of the abdominal muscles and the diaphragm. Still, this kind of vibrato is more laborious, difficult to play in fast-paced music, and easy to inhibit the level of music performance (Li, 2016). Scientific research has found that in slow rhythm playing, the sound of vibrato mainly relies on the strength of the diaphragm muscle, while the fast rhythm vibrato is achieved through the throat. Therefore, in flute vibrato practice, the player must combine the two, such as opening the chest and relaxing the throat. Keep your breath steady and control the strength of your breath, lips, and fingers for the best vibrato performance.

A good vibrato brings more density, effect, and intensity to the sound without deviating. The biggest function of vibrato is to change the timbre and sound quality, enhance the fluency of the melody, and enrich the music's personality. The perfect vibrato is like the expression in a person's eyes, which can express the most subtle and complex emotional fluctuations in the player's heart (Lou, 2013). When we play without any vibrato and tone changes from start to finish, that's a scary thing, and the listeners get bored and lazy.

Vibrato has a lot of different effects on hearing, and if we notice the vibrato part when someone else is playing, such a vibrato is problematic. Therefore, the tone should blend in with the sound. Vibrato should never be separated from the sound itself, regardless of the intensity and speed of change. The correct vibrato should be soft and contagious, with the following characteristics: 1. The vibrato makes the sound soft and smooth, and the amplitude and frequency of pitch fluctuations should not be too prominent. 2. The amplitude and frequency of vibrato fluctuations should be changed according to the phrases played and cannot be static. 3. The vibrato performance is based on the player's exquisite control of the instrument and a high level of artistic accomplishment.

References

Bayley, J. G. (2006). **Fundamentals of teaching flute vibrato.** Canadian Winds/Vents Canadiens: Journal of the Canadian Band Association, 5(1), 30-32.

Li, Z. (2016). **A Preliminary Exploration of Flute Vibrato Playing Skills**. Art Appreciation (03), 244.

Lou, M. (2013). **The application of vibrato in flute performance**, [Master's thesis].

Central Conservatory of Music. https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201401&filename= 1013350340.nh

Ma, L. (2014). Talk about several key points of flute playing enlightenment training. Music World (10), 36-39. Doi: CNKI: SUN: YYTD.0.2014-10-011.

Manning, D. C. (1995) "Woodwind Vibrato from the Eighteenth Century to the Present, Performance Practice Review, 8(1). DOI: 10.5642/perfpr.199508.01.06

Pang, T. (2019). Frequently asked questions about air vibrato training in flute playing and teaching. Modernization of Education (82), 339-340. doi:10.16541/j.cnki.2095-8420.2019.82.148.

Qian, Q. (2006). Intensive training in flute techniques (Vol. 2). Shanghai Music Publishing.

Ribelin, D. R. (1987). "An Overview of Pedagogical Techniques of Vibrato for the Flute". Theses and Dissertations. 74. https://csuepress.columbusstate.edu/theses_dissertations/74

Streitova, M. (2020). Types of vibratos in contemporary music and the possibility of their use in flute pedagogy. American Journal of Art and Design, 5(4), 97. https://doi.org/10.11648/j.ajad.20200504.13

Toff, N. (2012). The flute book: A complete guide for students and performers (3rd ed.). New York, NY: Oxford University Press.

Weait, C. (1988). "Vibrato Videotape," Flutist Quarterly 13 (Spring, 1988), 45

Wye, T. (2014). Trevor Wye guidebook for the flute (Vol. 4). Music Sales.

Xiong, Li. (2020). Based on the study of vibrato in flute playing and teaching. Artist (01), 111. doi: CNKI: SUN: YSJA.0.2020-01-094.