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The Historical Evolution, Limitation Analysis, and Reconstruction of the Classification System for Erhu Right-Hand Bowing Techniques

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Abstract. Erhu right-hand bowing techniques are the core of sound production and artistic expression, and the construction of their theoretical system is crucial to teaching practice and artistic innovation. This paper sorts out the development context of erhu right-hand bowing techniques from the exploration period in the first half of the 20th century, the systematic construction period in the second half of the 20th century to the refined research period in the 21st century. It analyzes the limitations of existing classification systems such as the "Three Elements of Bowing" and the "Three-Category Method" in terms of standards, concepts, and terminology. Based on the "spatial movement relationship between bow hair and strings", a new system of "Planar Bowing Techniques - Vertical Bowing Techniques" is constructed, and its value is verified through the practice of classic works. The research aims to provide a scientific classification framework for erhu bowing theory, promote the scientization of national instrumental music technology theory, and facilitate the inheritance and international dialogue of erhu art.

Keywords: Erhu, Right-hand bowing techniques, Classification system, Planar bowing techniques, Vertical bowing techniques

1. Introduction

As a representative of Chinese national bowed string instruments, the erhu has established a complete performance and education system since Liu Tianhua initiated its professional development. As the core technology for erhu's sound production, timbre, and artistic expression, right-hand bowing techniques have always run through the entire process of the instrument's transformation from a folk accompaniment instrument to a professional solo instrument. However, the current research on bowing theory lags significantly behind performance practice. Due to factors such as regional school differences and different expression habits, the theoretical system has problems such as different names for the same technique, ambiguous terminology, and overlapping classifications. These issues not only restrict the systematicness of teaching but also hinder artistic innovation and the scientization of theoretical construction. Therefore, systematically sorting out the historical context of erhu right-hand bowing techniques, analyzing the limitations of existing classification systems, and constructing a logically consistent classification framework are not only

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an inevitable requirement for improving the erhu theoretical system but also an important subject for promoting the modernization of national instrumental music research. Starting from the historical evolution of bowing techniques, this paper explores a scientific and unified classification system for right-hand bowing techniques by combining the deficiencies of existing classification methods, aiming to provide academic support for erhu teaching practice and theoretical research.

2. Historical evolution of erhu bowing techniques

The modern erhu bowing technique system specifically refers to the bowing system centered on the friction of strings with bamboo and horsehair after Liu Tianhua. This system was not formed overnight but is the collective achievement of generations of performers and educators through long-term exploration since the 20th century. Its development trajectory clearly reflects the transformation of the erhu from a folk opera accompaniment instrument to a professional solo instrument with independent artistic character and rich expressive force, and right-hand bowing techniques are the key driving force behind this transformation.

2.1. The first half of the 20th century: initial exploration period

This period was the embryonic stage of the erhu's transformation from a folk form to a professional one. Most representative figures promoted the standardization of traditional bowing techniques by drawing on Western violin performance techniques. Although relevant explorations were mainly based on practice and scattered teaching experiences and did not form a rigorous theoretical system, they laid the foundation for subsequent systematic research.

Liu Tianhua (1895-1932), as a pioneer of the modern erhu bowing system, broke through the limitations of traditional techniques from a perspective of "integrating Chinese and Western elements". He keenly perceived the shortcomings of traditional erhu bowing techniques, systematically drew on violin bowing concepts and basic training methods, improved techniques such as slow long bow, staccato, and tremolo, and innovated in combination with the erhu's instrumental characteristics and Chinese musical charm. In his ten famous works such as "Guangming Xing" (March of Light), "Kongshan Niaoyu" (Birds Singing in the Empty Mountain), and "Duxian Cao" (Solo String Exercise), his use of bowing techniques is highly distinctive. "Guangming Xing" shapes a march style with firm détaché and staccato, while "Duxian Cao" achieves rich changes in timbre and dynamics on a single string through precise control of bow speed and pressure. Although Liu Tianhua's discussions on bowing techniques were mostly empirical descriptions, the integration path he pioneered laid the cornerstone for erhu right-hand bowing techniques and even the professionalization of national music.

Zhang Jirang (1903-1970), a pioneer in the systematization of erhu education, focused his core contributions on textbook compilation and technique sorting. His "150 Basic Erhu Etudes" compiled from 1955 to 1958 first systematically and hierarchically summarized right-hand bowing techniques in the form of etudes, marking the transformation of erhu teaching from "oral instruction and heart-to-heart transmission" to a modern music education model. He foresightedly introduced the violin's "spiccato" technique into erhu performance, expanding the instrument's ability to express fast jumping phrases; at the same time, he specially discussed "bow holding method" and "bowing method", emphasizing the guarantee of scientific bowing for sound quality starting from basic posture and movements [1], providing a followable textual basis for right-hand bowing training and becoming a key step for the erhu to move towards the professional field.

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The "Jiang School" performance style founded by Jiang Fengzhi (1908-1986) is highly artistically distinctive in right-hand bowing techniques. In pursuit of a melodious timbre, he explored the contact angle between the performer and the instrument, emphasizing the fixed angle between the resonator and the performer's abdomen. When bowing, he kept the bow hair properly away from the bow stick and used more of the outer part. This control method reduced the contact area and pressure between the bow hair and the strings, making the attack softer and the timbre more primitive and vigorous. In works such as "Han Gong Qiu Yue" (Autumn Moon over the Han Palace) and "Xun Feng Qu" (Gentle Breeze Tune), his bowing techniques create a lingering and profound artistic conception [2], confirming that right-hand bowing techniques are not only technical means but also the core carrier of artistic expression.

In the late 1950s, performers from various regions also promoted the development of bowing techniques. Although these regional explorations were not widely recorded, they reflected the general demand in the erhu circle at that time to improve right-hand bowing skills, collectively forming a diverse picture of the early development of bowing techniques.

2.2. The second half of the 20th century: initial construction of systematic theory and standardization of terminology

With the establishment of professional music colleges and the setting up of erhu majors, there was an urgent need to systematically summarize performance techniques and compile standardized textbooks. The core task of this period was to sort out and name existing techniques, construct a preliminary teaching and training system, and the standardization of terminology was a key breakthrough in theoretical construction.

Zhang Shao (1927-2015) and Wang Guotong (1939-), as core promoters of the construction of the erhu textbook system, put forward the concept that "professional construction starts with textbook construction, and textbook construction starts with the compilation of technical etudes", which profoundly influenced erhu teaching for decades. The textbooks such as "Selected Erhu Etudes" compiled by them have become standard models for generations of learners. More importantly, they systematically summarized right-hand bowing terminology. In "Selected Erhu Etudes: Collected Works", chapters are titled such as "Staccato Exercises", "Détaché Staccato Exercises", and "Long Bow Exercises", which essentially classify bowing techniques and match each technique with special training materials. Thus, terms such as "long bow", "détaché", "legato", "staccato", "tremolo", and "spiccato" have transformed from regional common names into "universal language" for teaching and academic exchanges. This standardization not only provided a premise for in-depth research on bowing theory but also helped learners master techniques by category, promoting the popularization of erhu performance techniques at the grassroots level.

2.3. 21st century to the present: diversified, refined, and systematic research period

After the reform and opening-up, erhu art ushered in a prosperity of creation and performance. High-difficulty and new-style works put forward higher requirements for right-hand bowing techniques. The strong academic research atmosphere also made bowing research show a diversified, refined, and systematic trend.

Zhao Hanyang (1954-), a professor at the Central Conservatory of Music, has made outstanding contributions to the systematic sorting of bowing techniques. His compiled "Training of Erhu Bowing Techniques", as the achievement of the "211 Project Textbook Construction" project, represents the highest level of bowing training research in contemporary professional music

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colleges. The core advantages of this textbook lie in its systematicness and comprehensiveness, covering almost all mainstream bowing techniques at that time. For each bowing technique, it designs hierarchical etudes from basic movement essentials, correction of common problems, to intermediate and advanced comprehensive applications and breakthroughs in technical difficulties [3]. Zhao Hanyang's exploration aims to make erhu bowing training get rid of empirical and fragmented models and move towards scientization and standardization, providing a rigorous systematic support for contemporary bowing teaching.

Looking at the development of modern erhu right-hand bowing techniques, its trajectory clearly presents: from scattered experience to systematic theory, from learning and integration to independent innovation, from single technical training to comprehensive artistic pursuit. Every generation of researchers and practitioners has built on the achievements of their predecessors, promoting this art to a higher level.

3. Summary (partial) and defect analysis of existing classification methods

With the development of erhu performance art, scholars and educators have summarized bowing techniques from different perspectives, forming a variety of classification systems. These achievements provide a theoretical basis for in-depth analysis of classification problems and system reconstruction, but they also have obvious limitations, which need to be analyzed from the dimensions of classification logic, concept definition, and terminology standardization.

3.1. The "Three Elements of Bowing" theory

Ju Wenyu (1940-), a professor at Tianjin Conservatory of Music, has long been committed to erhu teaching and research on Guangdong Han music. His "Three Elements of Bowing" theory was formally proposed in 2010 in "On the Basic Principles of Erhu Bowing" (Journal of Tianjin Conservatory of Music). This theory goes beyond the listing of bowing phenomena and delves into the essence of erhu sound production. It holds that the quality, color, and changes of bowing techniques all depend on the coordination of three basic parameters: bow speed, bow pressure, and the attack method of the sounding point.

Bow speed, as the temporal dimension of bowing, refers to the running speed of the bow on the strings, which directly determines the sound intensity and the amount of bow used. A fast bow speed results in strong intensity and a longer required bow segment, while a slow bow speed results in weak intensity and a shorter required bow segment. A uniform and controllable bow speed is the basis of sound quality, and the instantaneous change of bow speed is the core of the sound effect of techniques such as staccato and sautillé. Based on this, Ju Wenyu initially divided bowing methods into "slow full bow", "medium speed half bow", and "fast short bow", providing ideas for classifying bowing techniques from the perspective of movement.

Bow pressure, as the force dimension of bowing, refers to the vertical pressure of the bow hair on the strings, which comes from the natural gravity of the bow and the arm, as well as the active force transmitted by the shoulder, arm, and wrist. Ju Wenyu emphasized that bow pressure must be accurately coordinated with bow speed. Excessively high bow pressure with excessively slow bow speed is likely to produce noise, while excessively low bow pressure with excessively fast bow speed will result in a weak and empty timbre. The subtle adjustment of bow pressure by fingers is the key to expressing timbre changes and the decisive factor for the formation of the "attack" of techniques such as staccato and marcato.

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The attack method of the sounding point focuses on the contact state between the bow hair and the strings at the initial stage of bowing, which determines the texture of the "attack" of the musical tone. It can be divided into "soft attack" (gradually accelerating and increasing pressure after gently touching the strings) and "hard attack" (instantly applying force and speed). Different attack methods directly affect musical expression. Soft attacks are mostly used in the gentle melodies of Jiangnan Sizhu (silk and bamboo music from the Jiangnan region), while hard attacks are needed for intense musical phrases expressing war scenes.

Ju Wenyu believed that the three elements "have their own characteristics and are interdependent", and they need to cooperate closely to form bowing sound production and bowing changes. He summarized the bowing principle of "taking bow speed control as the main factor and bow pressure adjustment as the auxiliary" [4]. Although this theory is not a complete classification system, it provides core theoretical support for constructing a scientific classification framework based on movement principles.

3.2. The "Three-Category Method" system

Based on the movement form and sound form of the bow hair on the strings, Lin Zi proposed the three-category classification system of "détaché", "legato", and "staccato" in "A Brief Introduction to Erhu Bowing Techniques", which has a clear logic and concise structure [5].

The core of détaché is "one bow per note". It is good at expressing brisk, powerful, and rhythmic musical phrases, and is the most widely used basic bowing technique in erhu performance. Lin Zi further refined it: "general détaché" is used for medium and slow speeds, emphasizing the independence and clear attack of each note; "fast détaché" is used for allegro sections, requiring a high degree of coordination between the left and right hands; "tremolo" produces dense staccato by rapidly shaking the bow tip or middle bow with the wrist to render the atmosphere; "doushou" (shaking bow) is regarded as a type of tremolo, emphasizing a shorter and more rapid effect.

Legato is characterized by "multiple notes per bow". It smoothly plays two or more notes in a continuous downbow or upbow, and is the core means to ensure the fluency and coherence of the melody line. It is especially suitable for expressing lyrical and song-like musical passages.

Staccato is defined as a collection of technical bowing techniques. Their common feature is that there are obvious pauses between notes, producing a jumping and fragmented sound effect. It includes specific techniques such as "staccato" (firm attack and sudden stop at the end of the note) and "spiccato" (making the bow hair jump off the strings by the elasticity of the bow, producing a short and brisk sound).

The advantages of the "Three-Category Method" lie in its clear logic and concise structure. It captures the three core structural forms of bowing in organizing melodies, and clearly lists "staccato" in parallel with "legato" and "détaché", helping performers understand the functional role of bowing from the perspective of musical syntax; at the same time, it emphasizes the correlation and transformation of various bowing techniques, avoiding treating techniques in isolation, reflecting dialectical thinking.

3.3. Defect analysis of existing classification methods

Although existing research has accumulated rich experience, from the perspective of historical development and theoretical logic, most classification methods (especially the traditional classification widely used in textbooks) have obvious defects, mainly reflected in the following three aspects:

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3.3.1. Mixed classification standards

This is the most fundamental problem of the existing system. Many textbooks and treatises do not follow the classification principle of "adopting a unified standard for one classification", and list categories divided by different standards in parallel, leading to confusion when learners initially establish the framework. A typical case is the undifferentiated parallel discussion of "long bow", "middle bow", and "short bow" divided by "bow segment used" (the part and length of the bow used) and "détaché", "legato", "staccato", and "spiccato" divided by "movement form". For example, "long bow exercises" and "détaché exercises" appear in the same etude collection, which is similar to listing "mammals" and "terrestrial animals" in parallel in animal classification. The two have different standards and there must be overlaps ("détaché" can be played with "long bow", "middle bow", or "short bow"). This mixed use of standards makes it impossible for learners to establish a clear logical system, and they can only memorize scattered knowledge, which hinders their understanding of the essence of bowing techniques and their flexible application.

3.3.2. Vague definition of core concepts

The lack of unified and precise definitions leads to vague areas in some core bowing concepts, making it difficult to achieve self-consistency in classification. Taking "détaché staccato" as an example: its technique is to continuously play multiple separated staccato notes in one bow. From the perspective of bow segment use, it belongs to "legato"; from the perspective of sound effect, it belongs to "staccato". It can neither be classified into the traditional "legato" (incoherent notes) nor "détaché" (not one bow per note), and it is even contradictory to the concept of "staccato". This "both legato and staccato" contradiction exposes the limitations of the old classification standards, which cannot accommodate compound performance techniques.

3.3.3. Ununified terminology naming

Terminology is the cornerstone of academic exchange, but there has been a long-term naming confusion in the field of erhu bowing techniques, which stems from the regionality of historical inheritance, the differences between schools, and the lag in the naming of new techniques.

On the one hand, there is "different names for the same technique". For example, the technique of using the gravity of the bow to throw it down, making the bow hair rebound on the resonator and jump continuously is mostly called "sautillé" in the north, while some southern schools call it "zhuanggong" (collision bow); the technique of producing dense sound points by rapid back-and-forth movement of the bow tip in an extremely short stroke is called "doushou" (shaking bow) in some documents, and "tremolo" in others. This confusion brings great inconvenience to academic research and teaching exchanges.

On the other hand, there is a lag and controversy in the naming of new techniques. With the emergence of new works, composers and performers have created many new techniques, but the naming has not been unified in a timely manner. For example, the technique of "lifting the bow hair and then rapidly scraping the strings" in "New Horse Racing" is called "dajigong" (grand marcato) by some, and "scraping", "knocking bow" by others according to the sound or movement. The lack of authoritative and unified naming has hindered the spread of new techniques.

In summary, most of the current erhu bowing classification methods are essentially "collections of local technical terminology" based on historical accumulation, rather than logically rigorous "scientific classification systems". Therefore, constructing a new classification system with self-

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consistent logic, unified standards, and strong inclusiveness has become an urgent task for erhu theoretical construction.

4. Construction and practical verification of a new classification system for erhu right-hand bowing techniques

The essence of erhu bowing techniques is the process in which force is transmitted to the strings through the bow hair to make them vibrate and produce sound. The characteristics of this process directly depend on the contact state and movement trajectory between the bow hair and the strings. Based on this, this paper takes the "spatial movement relationship between bow hair and strings" as the only classification standard to construct a new system for erhu right-hand bowing techniques, classifying all bowing techniques into two basic movement modes: "planar bowing techniques" and "vertical bowing techniques". This classification not only clearly defines the boundaries of techniques but also essentially reveals the force generation mechanism and timbre generation principle of different bowing techniques.

4.1. Category 1: planar bowing techniques

The technical core of planar bowing techniques is that "the bow hair maintains contact with the strings throughout the bowing process". The continuation of musical tones relies on the continuous linear movement of the bow on the plane of the resonator. Changes in timbre, dynamics, and rhythm are achieved by adjusting bow speed, bow pressure, and contact position.

4.1.1. Long bow

The long bow is the cornerstone of planar bowing techniques. Its core requirement is to maintain absolute uniformity of bow speed and pressure from the bow root to the bow tip. When playing, the shoulder joint is used as the axis to drive the upper arm to move at a constant speed, supplemented by subtle force control of the wrist and fingers, producing a full and continuous musical tone without bow change marks.

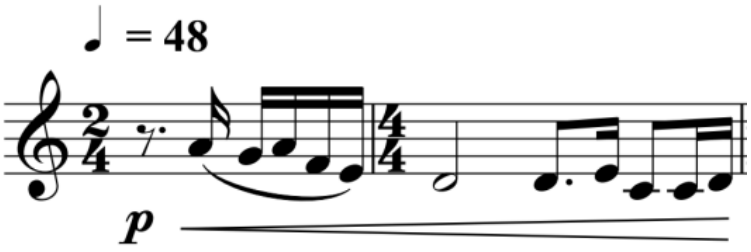

Figure 1. "Er Quan Ying Yue" score example

The opening introduction of "Er Quan Ying Yue" (Moon Reflected on the Second Spring) composed by Hua Yanjun starts with a descending long bow from the "la" note. It requires an extremely slow and stable bow speed and continuous bow pressure. Through precise control of the bow, each note is prolonged indefinitely, creating a desolate and sorrowful tone (see Figure 1).

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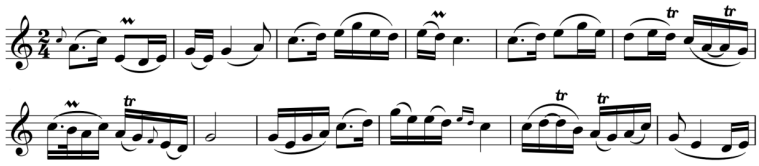

Figure 2. "Jiangnan Chun Se" score example

In the adagio section of the first movement of "Jiangnan Chun Se" (Spring Scenery in Jiangnan) composed by Ma Xilin and Zhu Changyao, the use of long bows requires a slightly faster bow speed and lighter bow pressure to pursue a soft timbre, expressing praise and lyrical poetry for the water towns in Jiangnan with light and fluent bowing techniques (see Figure 2).

4.1.2. Détaché

The essence of détaché is "one bow per note", but the movement modes vary significantly according to speed and dynamic requirements. General détaché is mostly medium and slow speed, emphasizing the independence and clear attack of each note. In terms of movement, it relies on the active swing of the forearm, assisted by the wrist, forming a complete process of "start - run - stop - bow change"; fast détaché is an advanced planar bowing technique. The force application point is transmitted from the forearm to the wrist joint and finger joints, making rapid and short left-right swings with the wrist as the axis. At this time, the bow segment used is extremely short, the bow speed is fast but the stroke is small, and the bow pressure needs to be light and concentrated to ensure the clarity and elasticity of the notes.

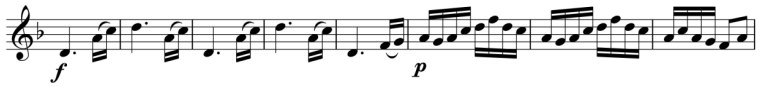

Figure 3. "Sai Ma" score example No.1

A large number of détachés in the final section of "Sai Ma" (Horse Racing) composed by Huang Haihuai are a typical application of fast détaché: they require flexible and uniform wrist swings, and the bow hair always "bites" the strings without generating excessive frictional noise, simulating the brisk and dense rhythm of horse hooves, depicting the lively and enthusiastic scene of the horse racing field, and pushing the emotion to a climax (see Figure 3).

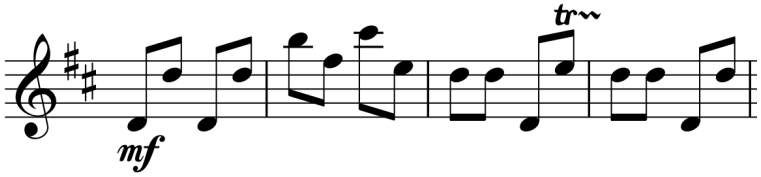

Figure 4. "Liang Xiao" score example

As the only fast section in the entire piece, the third movement of "Liang Xiao" (Beautiful Night) composed by Liu Tianhua uses a large number of general détachés combined with the high-pitched melody of the left hand, showing a relaxed mood under the moonlight with light and independent small détachés of the right hand (see Figure 4).

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4.1.3. Legato

The core of legato is "smooth transition of multiple notes within one bow". The kinematic essence lies in bow segment distribution and center of gravity translation. Performers need to accurately plan the bow segment occupied by each note within the limit of the total bow length according to the note duration and dynamics to ensure the fluency and coherence of the melody.

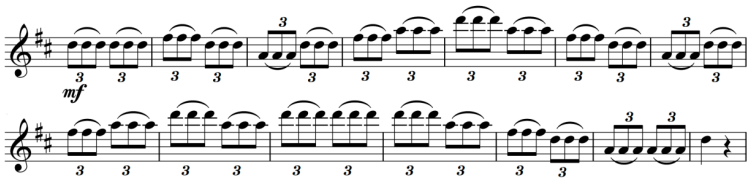

Figure 5. "Kongshan Niaoyu" score example

A large number of legatos are used in the fourth movement of "Kongshan Niaoyu" (Birds Singing in the Empty Mountain) composed by Liu Tianhua, combined with the left-hand tremolo technique to create the artistic conception of "hundreds of birds singing". This section has extremely high requirements for the coordination accuracy of the left and right hands. The movement of the right hand must be stable and uniform, and any acceleration or deceleration will destroy the realism of the picture (see Figure 5).

4.1.4. Staccato

Staccato is the embodiment of "explosive force" in planar bowing techniques. Its sound effect comes from the application and release of bow pressure in an extremely short time. When playing, the bow hair is pre-attached to the strings, and through the instantaneous force of the right-hand fingers and wrist, the bow pressure is sharply increased combined with a short bow speed. After generating the attack, the pressure is quickly released and the movement is stopped, but the bow hair never leaves the strings.

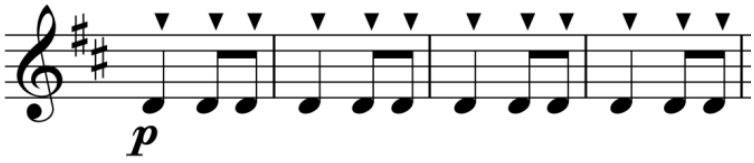

Figure 6. "Guangming Xing" score example

When creating "Guangming Xing" (March of Light) composed by Liu Tianhua, he drew on the techniques and styles of Western works. The four consecutive staccatos in the introduction have distinct march characteristics, requiring a powerful bow speed and solid bow pressure to produce a firm and full attack, shaping a forging ahead musical image and expressing the determination to pursue progress and light (see Figure 6).

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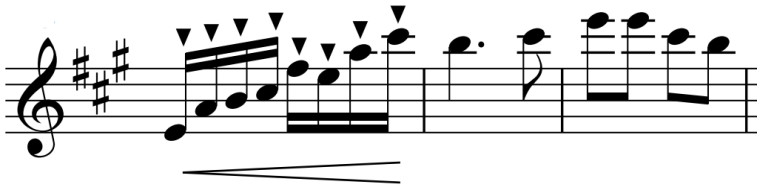

Figure 7. "Henan Xiao Qu" score example

As a local style solo work composed based on the tune of Henan opera, the staccato in the adagio section of "Henan Xiao Qu" (Henan Folk Tune) composed by Liu Mingyuan is light staccato, reflecting the humor of northern opera music and adding lively charm to the piece (see Figure 7).

4.1.5. Tremolo

Tremolo drives the bow hair to perform high-frequency and small-amplitude back-and-forth movements within an extremely short bow segment (mostly the bow tip or middle bow) through the wrist. The density and uniformity of the timbre depend on the frequency and stability of the vibration.

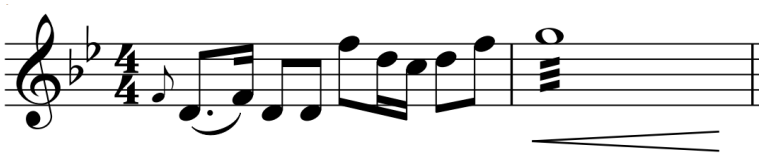

Figure 8. "Jiang He Shui" score example

In the section expressing grief and anger in "Jiang He Shui" (River Water) transplanted by Huang Haihuai, tremolo is used to play long notes, creating a trembling sound effect similar to crying, which is highly infectious (see Figure 8).

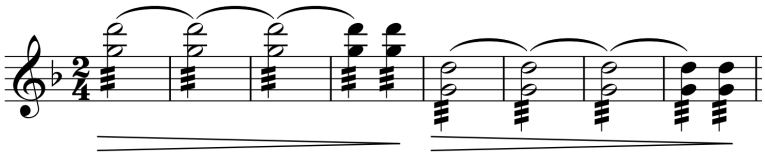

Figure 9. "Zhan Ma Ben Teng" score example No.1

In "Zhan Ma Ben Teng" (War Horses Galloping) composed by Chen Yaoxing, tremolo is used to imitate the howling of the wind, requiring a slightly larger amplitude and stronger dynamics to show the grand scene of thousands of horses galloping (see Figure 9).

4.2. Category 2: vertical bowing techniques

The technical core of vertical bowing techniques is that "the bow hair regularly and periodically leaves the strings during the bowing process". The generation of musical tones relies on the jumping and hitting movements of the bow perpendicular to the direction of the resonator. Its sound effect is

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not only controlled by bow speed and bow pressure but also the core driving force is the gravity of the bow when it falls. The sound characteristic is marked by "granularity".

4.2.1. Spiccato

Spiccato is a representative of vertical bowing techniques. Its movement essence is to give the initial horizontal speed by using the elasticity of the bow stick (especially the middle bow to lower middle bow segment), and then through the control of the fingers and wrist, make the bow hair jump naturally after hitting the strings each time. The movement trajectory is a sequence of regular parabolas superimposed on the two-dimensional plane movement. Spiccato is divided into "natural spiccato" (spontaneous jumping when the bow speed reaches a critical point) and "controlled spiccato" (actively controlling the jumping height and timing through the fingers and wrist).

A large number of controlled spiccatos are used throughout the piece "Hora Staccato" composed by Dinicu and transplanted by Liu Changfu. It requires active regulation by the fingers and wrist to ensure the clarity and brightness of each spiccato note at an extremely high speed, reflecting the fast rhythm and cheerful mood of Romanian folk dances.

4.2.2. Sautillé

Sautillé is the most ingenious technique in vertical bowing techniques. Its movement process is divided into two steps: first, give the bow an upward vertical initial force by lifting the arm to make it gain kinetic energy; then, the arm is lowered smoothly, and the bow hair falls to the resonator and hits the strings by the bow's own gravity. The bow hair jumps continuously and autonomously under the combined action of the strings and the resonator. In the whole process, the role of the right hand is more like a "guide" rather than a "force applicator".

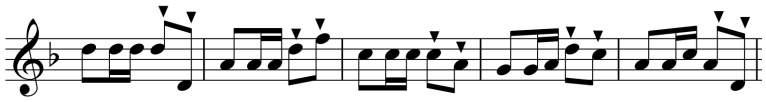

Figure 10. "Sai Ma" score example No.2

The melody played with sautillé in the middle section of "Sai Ma" (Horse Racing) composed by Huang Haihuai has a brisk and elastic timbre, vividly depicting the intense scene of horses racing against each other (see Figure 10).

4.2.3. Marcato

Marcato is a more impactful vertical bowing technique. Different from the "jumping" of spiccato and sautillé, its core lies in "hitting". The arm or wrist drives the bow to actively "smash" or "grab" the strings from a certain height. The bow hair hits the strings at a relatively high speed, and is lifted immediately after sounding. Its timbre is short, sharp, and full of explosive force, which relies more on active muscle force rather than the passive elasticity of the bow.

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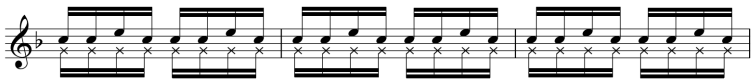

Figure 11. "Zhan Ma Ben Teng" score example No.2

In the section depicting the gallop of a group of horses in "Zhan Ma Ben Teng" (War Horses Galloping) composed by Chen Yaoxing, marcato produces dense "clattering" horse hoof sounds. This onomatopoeic technique greatly enhances the sense of hierarchy and imagery of the music (see Figure 11).

5. Conclusion

The evolution history of erhu right-hand bowing techniques is essentially a microcosm of the modernization of erhu art. From Liu Tianhua's pioneering path of integrating Chinese and Western elements to generations of educators constructing a systematic teaching system, bowing techniques have been continuously enriched in inheritance. However, theoretical construction has always lagged behind the vivid performance practice. The confused standards, vague concepts, and ununified terminology of the traditional classification system can no longer meet the needs of the development of contemporary erhu art.

The new system of "Planar Bowing Techniques - Vertical Bowing Techniques" constructed in this paper does not create new techniques, but provides a scientific logical framework for understanding complex bowing phenomena with the "spatial movement relationship between bow hair and strings" as the core. The value of this classification lies not only in solving the practical problems of traditional classification but also in providing a way of thinking "returning to the physical essence" for erhu teaching and performance: when performers can clearly identify whether a technique belongs to "planar friction" or "vertical impact", technical training will have a clear scientific basis, and the pursuit of timbre can also get rid of empirical exploration and move towards rational expression.

Looking at the development of world instrumental art, the high maturity of the Western violin is inseparable from the support of sophisticated bowing classification and training systems accumulated over hundreds of years. As an instrument carrying national cultural genes and having both traditional heritage and modern vitality, the future innovation and international communication of the erhu also need a solid theoretical foundation. The reconstruction of the classification system for right-hand bowing techniques is not only the need for the inheritance of techniques but also the key for erhu art to establish a rigorous "professional language". Only with the support of scientific theories can we, while adhering to the national charm, show the rational depth and artistic height belonging to this era, and realize more effective dialogue and communication of Chinese national instrumental music on the world stage.

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