



# Exploration on the Application of Artistic Voice Medicine in Vocal Performance Practice

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**Abstract:** With the development of vocal music art, voice health has become an important factor affecting the quality of singing and artistic expression. As an interdisciplinary field, art voice medicine integrates the theories of laryngology, vocal music, acoustics and physiology. Through laryngoscopy, acoustic analysis and vocal physiological monitoring, the vocal cord function, respiratory dynamics and resonance characteristics of the singer are scientifically evaluated. This discipline not only reveals the mechanism of vocalization and the law of voice injury, but also provides personalized training and protection programs to improve the performance of singing techniques and reduce the risk of voice injury. On the basis of combing the research status at home and abroad, this paper discusses the application of art voice medicine in vocal music performance practice, provides practical reference for voice protection, scientific training and vocal music teaching, and realizes the coordinated development of artistic expression and voice health.

**Keywords:** artistic voice medicine, vocal performance, voice health, interdisciplinary applications

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## 1. Introduction

Artistic voice medicine is an interdisciplinary field that integrates laryngeal science, vocal music, acoustics and physiology. It aims to study the vocal mechanism and voice health of vocal singers. With the increasing requirements of vocal performance on technology and load, scientific evaluation and voice protection have become the key to improving the quality of singing and prolonging the career life. Through laryngoscopy, acoustic analysis and vocal physiological monitoring, this discipline can reveal vocal cord function, respiratory dynamics and resonance characteristics, analyze common voice injury mechanisms, and propose personalized training and intervention strategies. On the basis of combing the research status at home and abroad, this paper explores the application of art voice medicine in vocal music performance practice, provides theoretical and practical support for scientific training, voice management and teaching, and realizes the collaborative optimization of artistic expression and voice health.

## 2. Theoretical basis of art voice medicine

### 2.1 Analysis of research status

Domestic art voice medicine started in the early days of the founding of the People's Republic of China. The scientific discussion of vocalization in the 1950s promoted the initial integration of vocal music and voice medicine. The 1957 National Vocal Music Teaching Conference and the 1961 Ministry of Culture Symposium marked the first climax, and the development was blocked during the Cultural Revolution. After the reform and opening up, the discipline construction has gradually recovered, and Professor Feng Baofu's 'Art Voice Medicine Essays' (1997) has laid a theoretical and practical framework. In recent years, domestic scholars have focused on exploring the objectification of voice evaluation system and drawing on international experience to promote voice protection and personnel training[1].

Foreign art voice medicine originated from the invention of indirect laryngoscope in 1864, and the application of electronic computers and speech mappers in the 20th century promoted the development of voice science. In recent years, research has emphasized interdisciplinary integration and technological innovation, such as flexible laryngoscope assisted singing teaching, machine learning to achieve voice classification, and systematic methods of medical intervention art voice.

In general, domestic and foreign studies have shown that art voice medicine plays an important role in the scientific training of vocal music, voice health and performance quality improvement. Drawing on international experience and strengthening multidisciplinary cooperation will promote the theoretical deepening and practical development of this field in China.

### 2.2 Overview of Artistic Voice Medicine

Artistic voice medicine is a typical interdisciplinary field, which integrates medicine, acoustics and music art theory. It

aims to systematically study the voice health, vocal mechanism and vocal cord injury prevention and rehabilitation of vocal singers. The research objects include professional singers, vocal music students and other high-intensity voice professionals. In recent years, scholars at home and abroad have made progress in laryngoscopy observation, acoustic parameter measurement, vocal physiological monitoring and psychological evaluation, which provides a basis for scientific training and voice health care. This discipline not only focuses on the diagnosis and treatment of voice diseases, but also emphasizes the introduction of medical knowledge in teaching to help learners understand the principle of vocalization, master scientific training methods, reduce the risk of vocalization, and improve singing efficiency and timbre quality[2].

### **2.3 Physiological mechanism of vocalization and vocal cord function**

Vocalization is a highly coordinated physiological process, which depends on the synergy of vocal cords, respiratory system and resonance system. The vocal cord vibrates under the exhaled airflow to form a basic sound, the respiratory system provides airflow and pressure, and the resonance organ shapes the timbre and volume by adjusting the shape of the cavity. In vocal music performance, different pitch, volume and voice requirements will affect the vocal cord vibration mode and respiratory muscle activity. For example, the treble needs vocal cord elongation, tension enhancement, and chest and abdomen breathing; the bass requires the vocal cords to be relatively relaxed, using chest resonance to enhance the volume. Understanding the physiological mechanism of vocalization can guide scientific training and prevent voice fatigue and injury. Training should pay attention to respiratory dynamics, vocal cord vibration, resonance regulation and coordination of articulation organs. Through the combination of theory and practice, targeted training can be achieved to improve the singing effect and reduce the risk of injury.

### **2.4 Common vocal music voice injury types and causes**

Common voice injuries in vocal performance include vocal nodules, polyps, chronic inflammation and edema, which are mainly caused by excessive use of vocal cords, improper vocal skills, excessive training intensity, lack of rest and psychological pressure. Early manifestations are hoarseness, timbre changes, pitch instability or vocal fatigue. If not intervened in time, it may develop into a chronic problem and seriously affect the career. Artistic voice medicine emphasizes ‘prevention first, intervention second’. Through laryngoscopy, acoustic analysis and resonance cavity training, combined with personalized vocalization program, problems can be found and corrected in time. Under the guidance of theory, vocal music training focuses on chest and abdomen combined breathing, vocal cord vibration efficiency, resonance cavity regulation and articulation organ coordination. Through scientific training, the quality of vocalization is improved, the risk of voice injury is reduced, and the performance practice is safer and more efficient[3].

## **3. The training and practice of vocal organs from the perspective of artistic voice medicine**

### **3.1 The application of respiratory dynamics and breath control in vocal music performance**

Respiratory organs are the driving force of vocal music, including lung, thorax, trachea and diaphragm. Inspiratory thoracic expansion, diaphragmatic sinking; when breathing, the thorax retracts and the diaphragm rises, providing a stable airflow for vocal cord vibration. In vocal music singing, the chest and abdomen combined breathing is often used to make the exhalation longer than the inhalation, and the breath is supported by the diaphragm to make the sound full and transparent. If the breath of beginners is too tight or too loose, it will lead to tension in the throat and stiff tone. Through scientific training, such as puppy-like inhalation and long-breathing ‘hissing’ exercises, it can enhance diaphragmatic muscle support, optimize the coordination of respiratory muscles, and promote the natural relaxation of the throat, laying a foundation for stable vocalization[4].

### **3.2 Scientific training method of vocal cord vibration mechanism**

Vocal cord is the core vibration organ of vocal music, and its opening and closing are controlled by posterior cricoarytenoid muscle, lateral cricoarytenoid muscle, arytenoid muscle and cricothyroid muscle. Beginners often have high voices that are not transparent due to throat and tongue tension. Scientific training is based on the premise of laryngeal relaxation, and the muscle group can be adjusted by silent exercises such as tongue extension, head swing and neck relaxation. Combined with chin support, maxillary natural and tongue base light touch exercises, inspiratory and expiratory training was carried out. Long-term persistence can relieve throat tension, improve vocal cord vibration efficiency and vocal quality, and provide a solid foundation for vocal singing.

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