

Available online at: <https://specedjournal.aspu.am/index.php/se>

VOCAL DISTURBANCES ENCOUNTERED AMONG VOICE-RELATED PROFESSIONALS

DOI:10.24234/se.v9i1.47

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ABSTRACT

This article aims to explore the adverse factors associated with voice-related professions and their impact on the vocal apparatus, offering an in-depth analysis of underlying causes, consequences, and symptomatic manifestations. The article thoroughly examines the primary causes of voice disorders frequently encountered by voice-related professionals and discusses specific physical illnesses that may be incompatible with continued professional voice use. A desk review methodology has been employed in this study.

This article provides a comprehensive exploration of the vocal challenges faced by professionals in voice-intensive occupations, emphasizing the importance of vocal preservation and effective preventive practices. It underscores that voice quality significantly influences professional performance across diverse fields including teaching, acting, singing, broadcasting, interpreting, and commanding roles within the military and judiciary.

The study identifies several primary factors contributing to vocal impairments, notably excessive vocal load, incorrect vocal techniques, chronic stress, poor environmental conditions, and detrimental lifestyle habits. Prevention strategies are systematically categorized into primary, secondary, and tertiary levels, emphasizing early identification, intervention, and rehabilitation for sustained vocal health.

Ultimately, the article argues for greater awareness and education on vocal hygiene and advocates the implementation of targeted preventive measures. Maintaining voice quality is presented not merely as a professional necessity but as a critical component for overall health, professional effectiveness, career longevity, and enhanced quality of life among voice professionals.

Keywords: *voice, vocal apparatus, vocal professionals, voice disorders, "voice onset attack," phonasthenia, resiaastheia, clesiaasthenia, dysodia.*

INTRODUCTION

In his pioneering works, the Greek scholar concluded that voice disorders are frequently linked to structural anomalies in the larynx and diseases of the respiratory system. Conversely, speech impairments often arise due to neurological conditions affecting the brain or mobility challenges within the speech articulation organs.

The human voice is an essential tool for individuals engaged in voice-related professions, such as singers, actors, teachers, broadcasters, and call center specialists. However, continuous and intensive use of vocal abilities often subjects these professionals to various negative factors, leading to considerable strain and potential damage to their vocal apparatus. Despite the significance of voice preservation within these vocations, there is still insufficient awareness of the risks and impacts associated with persistent vocal stress.

This article aims to shed light on the adverse factors influencing the vocal apparatus of voice-related professionals, examining in detail the underlying causes, the resultant health conditions, and the characteristic symptoms manifested in such situations. Furthermore, the discussion identifies the primary triggers for vocal disturbances encountered by voice specialists and analyzes specific physiological disorders that can render professionals unable to continue effectively in their voice-dependent careers.

By addressing these critical issues, this article seeks to enhance awareness, encourage preventative measures, and support effective management strategies to safeguard vocal health, thereby enabling voice professionals to sustain long-term career success and well-being.

HISTORICAL AND THEORETICAL OVERVIEW

The voice is one of humankind's innate characteristics. The process of voice modulation spans an extensive period in human life, from the moment of birth until advanced old age. At the moment of birth, an infant announces its arrival into the world through voice - expressed as a cry.

Historically, it is well-documented that the ancient Greek physician Hippocrates (460–370 BCE), often referred to as the "Father of Medicine," was among the first to explore the mechanisms of voice formation through the lens of human physiology. Hippocrates noted that voice production depends not solely on the anatomical structure of the larynx, but also significantly on an individual's overall biological condition. He observed that various illnesses could directly influence specific vocal attributes such as pitch, intensity, and timbre (Lavrova, 2022; Seliverstov, 2020).

It is noteworthy that several concepts commonly used in modern speech therapy already appeared in the works of Hippocrates. Among these terms are voice loss (aphonia), speech loss, speech difficulties, and stuttering.

Hippocrates' pioneering ideas on vocal disorders and voice formation laid foundational groundwork that was further developed by subsequent scholars, notably Galen, who became recognized after Hippocrates as the greatest medical theorist of antiquity. Galen significantly expanded upon these early concepts, enriching the understanding of voice and speech disorders and profoundly influencing the evolution of medical thought in these areas (Shashkina, Zhuravleva, Agayeva & Zolotvrev, 2024; Lavrova, Uklonskaya & Minaeva, 2021).

Claudius Galen (approximately 129–216 AD), an ancient Roman physician, surgeon, and philosopher of Greek descent, contributed significantly to the understanding of voice production by detailing the critical role of the respiratory system in phonation. Galen asserted that "everything in nature is created harmoniously," highlighting specifically that respiration temporarily ceases during voice production, reflecting the precise coordination required for phonation (Lavrova, 2022; Lavrova, Uklonskaya & Minaeva, 2021; Seliverstov, 2020).

After Galen, considerable insights into voice production and related pathologies were documented by the renowned medieval Persian philosopher, physician, and scientist Avicenna (Abu Ali al-Husayn ibn Abd Allah ibn Sina, 980–1037). In his seminal work, *The Canon of Medicine*, Avicenna meticulously described diseases affecting the vocal apparatus along with the relevant therapeutic interventions, thus laying foundational knowledge for modern phoniatic medicine (Dimon, 2024; Lavrova, 2022; Lavrova, Uklonskaya & Minaeva, 2021).

Furthermore, the Renaissance period saw revolutionary contributions to both art and medical science by the celebrated Italian polymath Leonardo da Vinci (1452–1519). His extensive anatomical investigations culminated in the creation of detailed anatomical atlases, which provided comprehensive insight into human anatomy, including critical descriptions of the structural features of the vocal and articulatory apparatus. Da Vinci's anatomical illustrations served as authoritative references for nearly three centuries, significantly advancing scientific understanding of voice and speech mechanisms (Shashkina, Zhuravleva, Agayeva & Zolotvrev, 2024).

Throughout history, the human voice has been a subject at the intersection of numerous scientific disciplines. From an acoustic standpoint, voice is studied as sound; biologically and biophysically, it represents the product of physiological processes; artistically, particularly within vocal performance, it is appreciated as an aesthetic phenomenon; and psychologically, the voice serves as an expressive indicator reflecting an individual's emotional and psychological states (Dimon, 2024; Lavrova, 2022; Lavrova, Uklonskaya & Minaeva, 2021; Seliverstov, 2020).

For example, according to numerous researchers, the melody of a voice conveys essential information about an individual's personality traits and emotional state. Renowned expert opinions

suggest that vocal melody provides meaningful insights into personal identity, physical and emotional health, and overall psychological state.

Reflecting on this idea, the celebrated researcher Andguladze aptly describes the human voice as the "foundation of language and poetry," emphasizing: "Through speech and song, the human voice conveys to us the entirety of human history, culture, and the emotional experiences of mankind" (Seliverstov, 2020).

While reflecting on the voice formation mechanisms, it should be noted that the process of voice formation involves the coordinated function of multiple anatomical systems, including the respiratory system, the larynx, the resonator cavities, and the articulatory apparatus (Lavrova, 2022). Essentially, the voice can be characterized as phonation occurring through coordinated activity, wherein the airflow generated during exhalation is shaped by the resonator systems (chest and head cavities) and modulated further by the articulatory apparatus, thus giving it its distinctive tonal quality and acoustic individuality (Sobolnikov, 2024; Lavrova, 2022; Lavrova, Uklonskaya & Minaeva, 2021).

The human voice is produced through a complex and coordinated interplay of various anatomical structures. At its core, voice production begins with the vibration of the vocal cords situated within the larynx. Structurally intricate, the larynx in adults is positioned at the level of the IV-VI cervical vertebrae, while in children it is located slightly higher, at the level of the II-IV cervical vertebrae. In elderly individuals, the larynx descends further, typically reaching as low as the VI cervical vertebra.

As air passes through the vibrating vocal cords, initial sound waves are generated. These waves then travel through the resonatory systems, including both chest and head cavities which significantly modify and enrich the vocal quality. The primary acoustic characteristics of the voice, such as pitch, intensity, and timbre, are ultimately determined through modulation by these resonator cavities and the articulatory apparatus, resulting in the unique vocal signature of each individual (Lavrova, 2022; Lavrova, Uklonskaya & Minaeva, 2021).

The intensity of voice is determined by the amplitude of vocal cord vibrations per second and is measured in decibels (dB). The greater the amplitude of these vibrations, the louder the resulting sound. Typically, during communication, the human voice ranges between moderate intensities of sound, approximately 40-70 dB. However, increased amplitude results in significantly louder sounds. For instance, professional voice users, such as singers, may frequently reach higher intensity levels ranging between 90-110 dB (Sapienza & Hoffman, 2020).

Pitch is determined by the frequency of vocal cord vibrations per second and is measured in hertz (Hz). During typical speech, the fundamental frequency in males ranges approximately from 85 to 200 Hz, while in females, it typically varies from 160 to 340 Hz.

Voice timbre is the distinct quality or tonal color of the voice, determined by the combination of vibration frequencies and amplitudes. Timbre is a unique vocal characteristic, that allows differentiation between individual voices. It enables listeners to recognize and identify individuals by their voices alone.

The vocal range represents the span between the lowest and highest tones an individual can produce and is highly specific to each person, varying considerably from one individual to another (Sobolnikov, 2024; Lavrova, 2022; Sapienza & Hoffman, 2020).

Thus, it can be inferred that the multifaceted nature of the human voice is inherently linked to its anatomically complex structure, capable of producing distinct tones and individualized vocal coloring. However, it should be noted that the vocal apparatus does not constitute an independent anatomical system dedicated exclusively to voice production. Instead, voice formation results from the coordinated interplay of various anatomical structures, including the respiratory and articulatory organs.

Specifically, voice production involves several anatomical components: the lungs, larynx, pharynx, diaphragm, trachea, bronchi, oral and nasal cavities, and associated resonator spaces. Indeed, vocalization is ultimately the product of additional coordinated efforts of the respiratory system (Sobolnikov, 2024; Lavrova, 2022; Lavrova, Uklonskaya & Minaeva, 2021).

Undoubtedly, how the voice is initiated—known as the "vocal onset" or "attack" plays a critical role in the quality of voice production. Vocal onset is typically classified into three distinct types:

1. Breathy onset (aspirate onset): This occurs when phonation begins with gentle exhalation before the vocal cords come together, causing them to subsequently vibrate. In this case, the voice emerges after an initial slight breathy noise.
2. Soft onset (simultaneous onset): In this type, the vocal cords come together simultaneously with the onset of exhalation, resulting in a smooth and balanced initiation of sound.
3. Hard onset (glottal onset): Here, the vocal cords are forcefully brought together before the onset of exhalation. Airflow subsequently pushes through the tightly closed vocal cords, initiating vibration. This type of vocal onset is characterized as harsh and abrupt and can, in some cases, contribute to vocal disorders or damage (Sobolnikov, 2024; Lavrova, 2022).

Consequently, for representatives of numerous professions, the voice serves as an essential "instrument" or primary "tool" of their professional activities. Damage to, or loss of, this vital resource can profoundly impact an individual's social status and significantly limit their professional capabilities and overall quality of life.

METHODS

This study employed a desk review methodology, involving a systematic analysis and synthesis

of existing scholarly literature, publications, textbooks, and other relevant academic sources (Grant & Booth, 2009). The desk review was conducted by identifying, evaluating, and integrating previous findings related to voice production mechanisms, vocal disorders, and related medical and pedagogical implications. Sources reviewed included both historical texts and contemporary publications, allowing for comprehensive coverage of theoretical foundations, empirical evidence, and expert insights on the subject matter. This methodological approach facilitated an in-depth exploration of the research topic, ensured accurate historical contextualization, and provided a robust foundation for the conclusions and recommendations presented in this article.

RESULTS

When considering specialists engaged in voice-related professions, it is important to acknowledge that many among them including teachers, educators, singers (musicians), actors, broadcasters, simultaneous interpreters, political and public figures, speakers, attorneys, judges, tour guides, telephone operators, coaches, military personnel (commanders), as well as organizational leaders frequently need to engage in prolonged speaking activities. Such extended vocal use may inevitably lead to excessive strain on the vocal apparatus, resulting in partial vocal disturbances or, in severe cases, complete loss of voice (aphonia).

In this context, it is crucial to highlight several adverse factors that contribute significantly to the development of voice disorders. These include stress, dry air, unfavorable or challenging working conditions, harmful lifestyle habits (such as smoking or excessive alcohol consumption), and noisy environments. Such negative influences increase the load on the vocal cords, ultimately resulting in diminished vocal quality and potential vocal impairment (Shashkina, Zhuravleva, Agayeva & Zolotvireva, 2024; Seliverstov, 2020).

In this context, the influence of various negative professional factors contributing to vocal disorders has been extensively documented. Particularly relevant is the research conducted by Seliverstov, highlighting the significant prevalence of voice disorders among specific professional groups. According to the presented data, tour guides show an exceptionally high incidence rate of voice disturbances (77%), followed by interpreters (31%), preschool and kindergarten teachers, and caregivers (educators) in childcare institutions (also significantly affected). Such statistical evidence underscores the direct relationship between profession-specific or profession-based vocal demands and the elevated risk of developing vocal impairments (Karpishchenko, 2023; Seliverstov, 2020).

It is important to emphasize that individuals engaged in voice-related professions are particularly vulnerable if they possess one or more of the following health conditions or disorders, which are

incompatible with effective long-term voice functioning:

1. Pathologies of the larynx, resonator system, or upper respiratory tract, including acute and chronic conditions such as laryngitis, rhinitis, tonsillitis, adenoids, sinusitis, adenoid hypertrophy, inflammation of the pharynx (pharyngitis), and other similar conditions.
2. Allergic disorders, including bronchial asthma, allergic rhinitis, and related respiratory allergies.
3. Neurological disorders and psychological conditions, which can negatively affect the quality, stability, and control of voice and speech.
4. Speech disorders and articulatory difficulties, which may hinder clear communication and professional vocal performance.

Therefore, these indicators of vulnerability underline the critical role of good vocal health, demonstrating that vocal integrity is not only integral to successful professional functioning but also significantly contributes to career development and longevity within voice-related and voice-dependent fields.

Finally, it is necessary to turn the attention to those professions that are classified according to the specific requirements related to voice quality.

(a) Professions requiring high vocal quality and specialized vocal technique:

These include professional singers, actors, and broadcasters. Singers must possess advanced vocal control, mastery of breathing techniques, and an ability to produce precise vocal nuances. Actors similarly face rigorous vocal demands, as they must effectively convey diverse emotional states and portray various characters using a wide range of vocal modulations, intonations, and expressive nuances. Broadcasters and media presenters must likewise demonstrate clear, articulate, and precisely controlled speech, as they directly communicate with large audiences. For these professionals, proper voice management and vocal hygiene are primary concerns and essential professional competencies.

(b) Professions demanding consistently clear and effective vocal communication:

These include educators, teachers in preschool institutions, instructors, guides, interpreters, trainers, and coaches. Within this group, the voice serves not only as a primary communication tool but also significantly impacts professional effectiveness. For instance, educators rely heavily on voice as a primary teaching instrument, directly influencing the effectiveness of the educational process. Hence, individuals in these vocations must possess vocal endurance and master fundamental vocal techniques, including proper breathing, voice modulation, and articulation. Furthermore, they must be capable of managing and overcoming common vocal challenges such as fear, anxiety, or tension during public speaking.

(c) Professions with high demand for vocal clarity and endurance, frequently in acoustically challenging environments:

These include attorneys, judges, military commanders, coaches, and other professionals regularly required to deliver prolonged speeches or commands clearly and persuasively, often under adverse or noisy conditions. For instance, legal professionals, including attorneys and judges, frequently speak during courtroom proceedings, necessitating vocal clarity, confidence, and endurance. Similarly, military personnel (particularly commanders) must frequently issue clear, audible commands in outdoor or acoustically challenging environments, a situation that significantly affects vocal quality and requires heightened vocal endurance and resilience (Sobolnikov, 2024; Karpishchenko, 2023; Lavrova, 2022; Orlova, 2008).

As demonstrated, each of these professions relies fundamentally on both verbal and vocal skills and non-verbal or paralinguistic cues. Non-verbal communication includes subtle nuances conveyed through tone, intonation, and other acoustic characteristics, which not only enrich the communicative process but also reflect an individual's personality traits, emotional state, and professional competence.

It is therefore evident that individuals engaged in voice-related professions must demonstrate a particular commitment to vocal care and preservation. This involves consciously managing, controlling, and maintaining vocal quality through consistent monitoring, the application of vocal hygiene practices, and proactive measures designed to protect their vocal health.

VOCAL HYGIENE

To effectively maintain vocal health, professionals engaged in voice-related occupations must understand and implement three levels of voice disorder prevention:

Primary Prevention involves measures taken before voice problems occur. Voice professionals should adopt preventive practices aimed at reducing risks associated with vocal disorders. Such measures include raising awareness about vocal hygiene, recognizing risks such as daily vocal overload (exceeding 6 hours per day), and proactively managing voice usage to avoid excessive strain. Additionally, primary prevention emphasizes maintaining appropriate vocal habits, adhering to optimal vocal routines, and avoiding vocal overload. It also involves educating voice professionals on optimal voice usage, proper vocal rest intervals, adequate hydration, dietary considerations, and lifestyle adjustments aimed at preventing the onset of vocal disturbances.

Secondary prevention involves the early detection and identification of vocal disturbances at initial or latent stages. This prevention level emphasizes timely diagnosis and prompt intervention to address emerging vocal disorders before they become chronic or severe. Regular screenings, early

diagnostic assessments, and ongoing monitoring of vocal health among voice professionals constitute essential strategies at this level.

Tertiary Prevention focuses on managing and mitigating established voice disorders to minimize their progression and reduce long-term impact. It is well-documented that vocal impairments significantly limit the selection and continuation of voice-dependent professions. Consequently, tertiary prevention emphasizes interventions aimed at rehabilitation, therapeutic support, and social and occupational adaptation of individuals experiencing vocal disorders. This level involves rehabilitative practices, voice therapy, as well as comprehensive social and vocational adaptation measures designed to support individuals in maintaining or returning to professional productivity and quality of life.

One of the essential challenges is to explore and establish the relationship between vocal preservation practices and the prevention of voice disorders.

Now, let us examine the primary causes contributing to the occurrence of voice disorders among voice-related professionals.

Primary causes contributing to voice disorders among voice-intensive professionals include:

- Overuse or misuse of the vocal apparatus: Incorrect vocal techniques, excessive vocal strain, and failure to adhere to appropriate vocal hygiene practices (e.g., shouting, speaking loudly, prolonged voice usage without adequate rest).
- Stressful nature of certain occupations: Direct communication with the public or groups (e.g., community, school, family, colleagues) entails high responsibility, often leading to emotional overload and heightened psychological stress. Additionally, personal, familial, psychological, and workplace tensions, including interpersonal conflicts, directly influence voice health. Such chronic stressors may escalate, resulting in borderline psychological conditions, such as neuroses, depression, anxiety, and ultimately professional burnout.
- Adverse environmental and working conditions: Ecological and occupational factors, including exposure to extreme or fluctuating temperatures, strong winds, high humidity, poorly ventilated rooms, dry air, and unsuitable indoor temperature conditions, may lead to physical, psychological, and general health concerns (e.g., chronic fatigue, headaches, respiratory issues, reduced immunity). Persistent exposure to dust may additionally affect respiratory health, causing allergies, respiratory tract irritation, and, with prolonged exposure, chronic respiratory diseases. Furthermore, detrimental lifestyle habits such as smoking, alcohol abuse, and poor dietary choices exacerbate these issues, negatively influencing overall vocal and general health.

Incidentally, functional voice disorders include conditions such as phonasthenia, hypo- and hypertonic aphonia (complete loss of voice), and dysphonia (partial voice impairment).

The term phonasthenia (phon—"voice," asthenia—"weakness") is used to describe a common vocal dysfunction among voice-intensive professionals. Unlike organic voice disorders, phonasthenia typically shows no initial visible anatomical changes in the vocal apparatus. Its characteristic symptoms include incompatibility between breathing and phonation, variability in vocal intensity (excessively loud or weak voice), and in severe cases, a complete inability to produce voice, known as aphonia (Shaboyan, 2024; Lavrova, 2022; Sapienza & Hoffman, 2022; Orlova, 2008).

Interestingly, the term monophonic ("monophonic") was first introduced by Fraenkel (1887) to describe functional voice disorders characterized by vocal fatigue and impairment without visible anatomical changes. However, many contemporary authors prefer the term phonasthenia (from Greek: *phōnē* - voice, and *asthenia* - weakness), originally proposed by the German physician Hermann Gutzmann in 1890, to characterize such disorders. Later widely accepted and used internationally, phonasthenia describes symptoms such as vocal fatigue, fluctuations in vocal intensity, and difficulty maintaining consistent voice quality conditions frequently observed among professionals with intensive vocal workloads.

The neurologist Edward Flatau (1906), in discussing phonasthenia, defined it as a functional vocal disorder characterized primarily by voice loss or vocal fatigue without any observable organic changes in the vocal apparatus. Flatau associated phonasthenia closely with professional voice use, emphasizing that individuals from different professions exhibit distinct vocal symptoms. Based on his observations, Flatau categorized phonasthenia into the following forms:

- **Resiasteniya:** A vocal disorder predominantly observed among teachers, actors, and public speakers, characterized by vocal fatigue resulting from prolonged vocal use.
- **Klesiasteniya:** A voice disorder commonly found in military commanders and sports coaches, whose professions demand strong, authoritative vocal projection, often in challenging acoustic environments.
- **Disodia:** A disorder specific to singers and musicians who perform softly or in whispered singing styles, such as guitar, kanun, kamancha players, and similar instrumentalists (Shashkina, Zhuravleva, Agayeva & Zolotvrevva, 2024).

The renowned Egyptian phoniatician Nada Kotby (1995) further described phonasthenia as a specific form of dysphonia with distinctive features significantly impacting the individual's quality of life, although these symptoms often remain unnoticed by clinicians. Kotby highlighted typical patient complaints, including sensations of throat dryness, reflexive coughing, respiratory difficulty, vocal challenges in stressful situations, and noticeable voice changes following prolonged speaking. Furthermore, Kotby defined disodia as a singing-specific voice disorder that, notably, does not typically

hinder normal speech communication (Shashkina, Zhuravleva, Agayeva & Zolotvrevva, 2024; Abitbol, 2018).

Thus, it is evident that vocal disorders among voice-intensive professionals are primarily triggered by multiple negative factors, including excessive vocal fatigue, improper vocal techniques, infectious and viral illnesses, unfavorable environmental conditions, and psychological stressors. To effectively prevent these disorders, particular attention must be paid to the correct application of vocal techniques, consistent vocal hygiene, and awareness of proper voice care principles. Neglecting these essential preventive measures can inevitably result in significant vocal impairments, or in severe cases, even the total loss of voice (aphonia).

CONCLUSION

Maintaining optimal vocal health is essential for professionals whose careers depend extensively upon effective voice use. This article highlighted the critical relationships among profession-related vocal demands, physiological mechanisms of voice production, and factors influencing vocal disorders. It emphasized historical perspectives and contemporary research, reinforcing the need for comprehensive vocal care strategies.

Given the multifaceted nature of vocal disorders ranging from functional issues like phonasthenia to more specialized forms such as resiastheniya, klesiastheniya, and disodia it is evident that preventive approaches should be systematically applied at all levels. Effective primary prevention, regular screenings for early diagnosis, and specialized rehabilitative interventions are fundamental for minimizing occupational risks and preserving vocal capabilities.

Ultimately, increased awareness and rigorous adherence to vocal hygiene practices, coupled with targeted educational initiatives, are crucial for safeguarding vocal quality. Such efforts not only support professional success but also significantly enhance the overall quality of life, ensuring that voice-related professionals continue contributing meaningfully to their respective fields without compromising their vocal health.

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The article submitted and sent to review: 22.10.2024

Accepted for publication: 19.02.2025



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