

Voice Information

CARING FOR YOUR VOICE

Human voice provides the means for the most of our communication: It is the source of much of our inspiration, our training, our entertainment, our enlightenment, our encouragement, and our engagement with each other. Your voice is the extension of your personality into the world around you. We usually think of voice as being just the “voice box” (larynx). But actually, voice is a noun that refers to a complex set of processes that produce our vocalizations. The voice mechanism consists of an array of elegant structures for the following functions: Power generation (airflow), sound generation (vocal fold vibration), and sound resonance/shaping (articulation).

The power source we use is, of course, the air pressure provided from the lungs. The lung tissues themselves do not provide much of the active source of the airflow. (The lungs sacs <alveoli> do have some elasticity for compressing air.) The power for airflow arises from the contraction of the chest wall muscles, the passive recoil of the diaphragm, the support of the abdominal wall muscles, and the recoil elasticity of the connective tissue within the lungs. The major focus of power for active singing, performance speaking, and loud, active talking develops from the short muscles (intercostals) between the lower floating ribs. The efficient supply of airflow for the power of voice production comes more from how the air is brought in, rather than how the air is “forced” out. If the inhalation pattern is focused more upper chest, the airflow support will likely be weak. If the inhalation pattern is focused lower chest, the airflow support will likely be more robust.

The vibration that is the source of the voice is generated by aerodynamic, myoelastic action of the vocal folds. The term “vocal cords” can be misleading. These are not “cords,” but rather are two specialized folds of mucosal skin overlying the two vocalis muscles inside the larynx (voice box). When the vocal folds are brought into close approximation, the airflow below the vocal folds begins to increase in pressure (this is a light pressure). The increased air pressure causes the vocal folds to rapidly and momentarily burst apart. With the air pressure then rapidly decreasing, the myoelastic tension of the vocal folds increasing, and the rapid airflow causing a negative air pressure at the glottis (the opening between the vocal folds), the vocal folds return to their closed state. This sequence of the opening and closing of the vocal folds occurs from 40-50 times per second to several hundred times per second. The slower the vibration rate, the lower the fundamental frequency (sort of like pitch) of the voice. The faster the vibration rate, the higher fundamental frequency of the voice. The vocal folds are held in a less tensed, thicker posture for lower sounds and tighter and thinner for higher sounds. The “blips” of air that burst between the vocal folds perturbate the air column in the throat, mouth, and nose and create sound waves, not unlike the sound waves created within the pipes of a pipe organ.

Good voice functioning requires good control of the resonating system. The sound that is generated at the level of the vocal folds would sound similar to a high pitched noise, not unlike the sound created by blowing a trumpet mouthpiece

vigorously. What occurs above the level of the vocal folds in the resonance of the voice forms each individual's distinctive voice. Sounds resonated primarily in the mouth have more of an open, clear tone. Sounds resonated in the back of the mouth have more of a throaty tone and feel. Sounds resonated in the nose have more of a nasal quality. The variations in movement of the mandible, the tongue, the soft palate, and the lips are very important in the production of voice. Although control can be difficult, the elevation of the larynx can affect voice production. The voice sound must also resonate within the chest, although that sound we do not hear. This occurs because the air vibrates both above the vocal folds and below the vocal folds. Developing an understanding of how the voice is produced helps in realizing how voice problems can arise and care that should be provided. The care of the voice focuses on the structures involved in voice production: Problems with the breathing mechanism for power generation, problems with sound generating structures (the vocal folds), and problems with sound resonance (the mouth, throat, and nose).

Breathing problems are frequently incurred by avocational and professional voice users. Active singing is an aerobic activity. As such, a singer or public speaker, should develop healthy breathing patterns and physiological support for the use of the voice. Problems with recurring upper and lower respiratory illness or conditions certainly can compromise voice ability. Allergies and asthma should certainly be addressed medically to minimize their effects on voice production. Postural support problems can adversely affect singing or speaking ability. With poor musculoskeletal support for breathing a performer must recruit greater vocal effort to produce the desired voice. Accidents, illness, and aging all play an active role in limiting voice performance by affecting breathing patterns and capacity. Good body posture and breathing patterns are essential to efficient, effective, and economical voice production.

Researchers have given us a considerably better understanding of the elegant structures of the larynx. The outer shell of the larynx is composed of two cartilages: The thyroid and the cricoid. The vocal folds attach anteriorly to the inside of the thyroid cartilage. They attach posteriorly to the two arytenoid cartilages, which are shaped somewhat like pyramids and move on upper posterior rim of the cricoid cartilage. Think of the vocal fold as a triple layered structure: A tough, flexible cover; an intermediate connecting layer (sort of like a loose velcro attachment of the cover); and a deep layer providing support and mass. The muscles of the larynx are arrayed in such a fashion as to allow multiple matrices of coordination for adjusting the length, tension, thickness, and rigidity of the vocal folds. The nerves that supply the larynx are arranged so that there is a pacing of breathing movements and oral movements to vocal fold movements.

There are many different types of problems that can occur with the structures of the larynx. A familiar term is "vocal nodules." A vocal nodule is a little like a callous. The callous on the hand is more a build-up of keratin and collagen cells. The nodule is a build-up of elastin cells. These nodules stiffen the vocal folds and interfere with closure of the vocal folds. They occur from increased collision forces during voice production. Another structural problem of the vocal fold is vocal fold polyps. These are a little like an abrasion blister. They are fluid filled masses that weight and restrict the vocal folds and interfere with vocal fold closure. Airborne irritants can contribute to their formation. Also, increased compression of the vocal folds tends to create them. Vocal fold cysts are similar to cysts that can occur on the skin. When these are quite small, little impact on the voice is recognized. If they become enlarged, they adversely affect the vocal fold on which they occur. Vocal fold hemorrhage is the acute rupture of one or more capillaries on the surface of the vocal fold. The accumulated blood

causes the vocal fold to swell. Unless great care is taken in the early stages of this problem, long term fibrotic thickening and scarring can seriously impair voice production. Most incidents of acute laryngitis result from voice abuse (extension loud yelling or screaming) or infection and inflammation of the vocal folds. These should resolve quickly with a few days of voice rest.

Singing teachers and voice therapists have long appreciated the need to develop control of the resonating/shaping structures to provide an environment in which voice may be appropriately produced. The need to produce a variety of consonants and vowels adds to the complexity of the task of voice production. Simple vibration would provide the unimpeded resonance of voice and most likely the purest, clearest voice, but without the intelligibility of speech added to song. The art of voice training seeks to solve this problem by devising means to shape the resonating and articulating structures so as to provide the clearest and best voice. Problems in the resonating structures can be quite varied. An often problematic area is the soft palate and its functioning. With poor velopharyngeal (soft palate and throat wall muscles) closure during phonation increased nasal resonance occurs. This can affect clarity and pleasantness of vocal tone. On the other end of the spectrum lies decreased nasal resonance with poor qualities noted in the voice. Mandible (lower jaw) movement and mobility can also affect resonance. Limitations in movement can decrease the resonating cavity size needed for louder, more intense voice production. Tongue tension or weakness can adversely affect oral resonance and voice production. Even minor speech articulation deficits can impact on voice production. Oral skeletal and dental problems can also interfere with good voice resonance. Often forgotten is that the teeth are the significant portion of the bony support of the lower 1/3 of the face. Hence, good dental care can be part of voice care.

For the avocational or professional voice user, whether for singing or speaking, good training is essential. Ongoing training and practicing are the foundation of good, long term voice functioning. Napoleon Hill, probably the first really effective motivational speaker and sales trainer, instructed his salesman and students to practice reading aloud, with vigor, inspirational passages for 10 minutes every day. This is probably, good advice for performer.

Good voice hygiene and care require several considerations:

***Adequate hydration is essential for vocal health. The vocal folds, the resonating structures, and the lung tissues are all covered by mucosal membranes. They like to be moist and warm. Good hydration aids the body in caring for these structures.**

***Avoid rigorous voice use with an upper respiratory infection or condition. Too often, individuals try to perform with the vocal folds inflamed and in poor physical conditions. Serious fold damage may result.**

***Adequate warm-up drills should be a part of the singing and speaking regimen.**

***Practice of good body posture and support helps to establish the best breathing patterns.**

***Young performers need caution in the use of the voice for performance. The structure of the vocal folds are not mature and are not as durable as they are for the adult mechanism.**

***Develop a “front, forward” feel of the voice, as if speaking into the “mask.”**

***Use amplification when available, and as needed.**

***Develop good speech articulation skills.**

***When traveling, allow the voice to rest. Cars and planes are very noisy. Avoid talking in those environments. This can cause you to speak too loudly and intensely for lengthy periods of time.**

***Limit caffeine consumption; it is a diuretic and dries out the mucosal linings of the throat. When drinking caffeinated beverages, increase water intake to help compensate.**

***Develop a good mental image of voice production and anchor voice production to good experiences.**

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