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Voice Rest

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All too often, "Don't sing" is the unnecessary prescription given to patients for various vocal maladies. "Don't speak" is a less common recommendation, and it is justified even more rarely. Certainly, in many circumstances, voice rest for short periods of time is safe, conservative, and helpful to an ailing performer. Because one can be fairly certain that a prescription of voice rest will not result in injury to the voice, it also may be a comforting course for the laryngologist who is not intimately familiar with the techniques and latitudes of vocal performance demands. It is true that improper voice use under adverse circumstances may result in injury to the vocal folds. However, while canceling concert commitments may not damage a larynx, cancellations may damage seriously a performer's career, especially in the early years of an artist's professional exposure. Consequently, it is helpful for the laryngologist, performer, and teacher to understand various forms of voice rest, as well as the circumstances under which their prescription is reasonable.

ABSOLUTE VOICE REST

Absolute voice rest is silence. The singer, actor, or other voice patient is instructed to communicate only with a writing pad or computer. In selected cases in which verbal communication seems essential (e.g., a person at home with small children), the use of an electrolarynx may be helpful. Alternatively, common phrases may be recorded and played back as needed.

In the past, absolute voice rest was prescribed for conditions ranging from vocal nodules to acute laryngitis. Sometimes it was enforced for 6 weeks or more. This is never appropriate and may cause muscle atrophy and further vocal injury. A recommendation of total silence is virtually never required for more than approximately one week; in fact, some laryngologists no longer require absolute voice rest even after vocal fold surgery. According to a study by Behrman and Sulica, in which 1,208 otolaryngologists responded, 51.4% recommend complete voice rest postoperatively after excision of benign vocal fold lesions (nodules, polyps, and cysts) to promote healing, while 63.3% prefer relative voice rest, and 15% require no voice restrictions.[1] Many factors are believed to contribute to disparate recommendations for voice rest in clinical practice. Among them are differences in beliefs regarding the physiology and healing of the vocal fold mucosa, surgical techniques, pre-

and postoperative voice therapy, patient compliance/adherence to treatment, and characteristics of the vocal fold lesions. These, combined with a lack of empirical evidence for clinical management recommendations, negative impact on patients' quality of life, and poor patient adherence, contribute to this variability and inconsistency in clinical practice.

Following acute vocal fold injury, such as a mucosal tear, hemorrhage, or a mucosal incision from vocal fold surgery, a short course of absolute voice rest is reasonable to minimize trauma while the mucosa repairs itself.[2] This suggestion is supported further by canine research examining the effects of absolute voice rest (resected recurrent laryngeal nerve) after phonomicrosurgery. Phonomicrosurgery was performed on 20 adult dogs. The recurrent laryngeal nerves of 10 of these dogs were divided simulating iatrogenic voice rest. The remaining 10 dogs were allowed to phonate normally after surgery. The healing process of each group was monitored weekly for the next 12 weeks. The dogs that were forced to rest their voices healed more quickly, with complete reformation of the basement membrane of the vocal folds noted 2 weeks postsurgically and complete rearrangement of the mucosal cover by 8 weeks. Based on these findings, the researchers recommended a 2-week voice rest period following phonomicrosurgery.[3] This somewhat conservative recommendation could be attributed to the fact that the dogs' healing vocal folds were examined only once weekly. Another animal study using rabbit larynges conducted by Mitchell et al. provides data that may support mobilizing tissue postmicroflap surgery as early as 3 days after microflap surgery.[4] The study looked specifically at the effects of tissue mobilization on wound healing of the vocal folds, and the presence of acute inflammation after surgery. Twenty-four rabbits were randomized into six groups of four. The experimental group received experimentally induced phonation for 3 second trains every 7 seconds for 30 minutes after microflap surgery on postsurgery days 0, 3, and 7, while the control group received the microflap surgery without phonation. The findings "revealed an acute inflammatory response" in the rabbits' vocal folds from the day of the surgery through 3 days post surgery. By postsurgery day 3, there was a decrease in inflammatory cells, and "essentially no evidence of inflammation by post operative day 7." The authors suggest that because the acute inflammatory response ended around day 3, the data from this study may support mobilizing tissue after inflammation has subsided and the active tissue remodeling process has begun.

This finding is supported further by the study done by Verdolini et al., in which acute vocal fold inflammation was shown to improve with tissue mobilization using relatively large amplitude, low impact vocal fold exercises (resonant voice exercises), compared with spontaneous speech or voice rest.[5] In this study of 9 vocally healthy subjects, complete data sets were obtained for three inflammatory markers (IL-1SS, IL-6, and MMP-8) for 1 subject in each treatment condition. Subjects were exposed to 1 hour of vocal loading, were randomized into groups for 4 hours of clinical treatment, and were instructed to continue their respective treatment protocol until the next day. Secretions were suctioned from participants' vocal folds and monitored for markers of tissue injury and inflammation at baseline, immediately after the vocal loading procedure, after the 4 hours of treatment, and 24 hours after baseline. At the 24 hour follow-up, the results were worse for the spontaneous speech condition (no voice limitation post loading), improved significantly in the voice rest condition, and were the best in the resonant voice group. While direct correlation to clinical management of vocal fold inflammation and wound healing is not yet straightforward, this study suggests that controlled, large amplitude, low impact, vocal exercise may have clinical value in the presence of acute vocal fold injury.

Absolute voice rest is also reasonable following acute vocal fold hemorrhage to minimize local trauma and the chances of recurrent bleeding or unfavorable scarring. These are the only medical conditions that generally call for absolute voice rest; and even in these conditions, its efficacy has not been proven convincingly. Nevertheless, extensive anecdotal experience supports the use of voice rest under these circumstances.

At present, we recommend absolute voice rest until the mucosa has healed or a hemorrhage has resolved. This may take anywhere from 2 to 7 days and occasionally longer. Other possible indications for absolute voice rest exist. Research has shown that a short period of absolute voice rest may help achieve and sustain a longer period of voice improvement for spasmodic dysphonia (SD)

patients following Botulinum toxin injection.[6] As outlined in this research, these findings may be linked to the vascular, biomechanical, or biochemical effects of phonation. In other research involving *in vivo* canine subjects, an increase in blood flow to the muscularis layer of the vocal folds was found during phonation.[7] This vascular change may diminish the effects of Botulinum toxin on the voice of the patient with SD, because it may promote removal of the toxin from the injection site. Further, the muscular contractions associated with phonatory activity may physically redistribute the substance from the target site to surrounding areas. Additionally, the molecular structure of Botulinum toxin (which is affected adversely by shaking and heating) may be physically changed by the vibration and heat associated with vocal fold movement.[8] Often other injections or implantations, such as collagen or fat, are introduced into the lateral aspects of the vocal folds to compensate for nerve paresis or weakness. It is possible that the vascular, biomechanical, and biochemical phonatory effects described above may affect the outcome of these procedures. Hence, the above research suggests that a short voice rest period might also be advisable for these cases.

Patients on absolute voice rest should be aware that whispering may result in vocal fold contact and is not an acceptable alternative to silence or soft verbal communication. A 1989 study examined laryngeal configuration during quiet whispering and stage whispering.[9] During performance of the "low-effort whisper," no subjects exhibited vocal fold contact, whereas 3 of 5 subjects exhibited vocal fold contact during "high effort whisper" or "stage whisper." The authors noted that subjects intermittently switched between the two modes of whispering without being conscious of their behavior. Additionally, in some cases, the glottis was actually larger during production of the high effort whisper.

Traditionally, we have not condoned the use of whisper as a form of voice rest due to the probability of excess tension in the extrinsic laryngeal musculature during high effort whispering, the possibility of patients unknowingly switching whispering "modes," and the likelihood of patients not performing the low effort whisper in the proper manner.[10] However, we have reexamined this belief recently and are reconsidering the appropriateness of whispering for voice rest in selected patients.[11]

Although otolaryngologists, voice therapists, and singing teachers for years have warned patients that whispering is more traumatic to the vocal folds than normal speech, no sizable series of patients had been examined fiberoptically to test this hypothesis. We evaluated 100 patients during flexible fiberoptic examination.[12] The basic paradigm used to evaluate laryngeal hyperfunction was to look for compression of the supraglottic structures during phonation. If whispering is more harmful to the vocal folds than normal speaking, it seemed reasonable to assume that patients should demonstrate evidence of increased supraglottic hyperfunction and the true vocal fold should make firm contact during whispering. Whispering involves increased airflow in addition to a change in laryngeal resistance. An open channel through the larynx for air escape is necessary to produce a whisper. However, it is conceivable that the glottic opening might be wider during whisper than during normal speech; and despite an apparently unfavorable supraglottic configuration, the true vocal folds still might not touch during whispered speech (although it is not always possible to assess this by fiberoptic examination from above). In the majority of cases, we found that whispering appeared to result in laryngeal configurations that are probably more traumatic to the vocal folds than normal speech. However, in some patients, whispering did not appear to be more traumatic; in fact, in some patients, whispering appeared healthier for the true vocal folds than normal speech. Fourteen of our patients had no true vocal fold contact during whispered speech, and 5 of the 14 showed improved supraglottic configuration (reduced hyperfunction during whispering, compared with habitual speech). An additional 5 patients showed no change in supraglottic appearance. Comparisons with soft speech and "confidential voice" have not been made but are planned for future study. Although we consider our study inconclusive, and we recognize that absence of vocal fold contact does not necessarily ensure absence of vibratory margin trauma (from aerodynamic forces), we are less certain than we used to be that whispering is contraindicated for all patients on voice rest. Further study is recommended.

In addition, playing certain wind instruments is accompanied by significant vocal fold contact. If the patient is a brass or woodwind player, it is best to use a flexible fiberoptic laryngoscope to observe the patient

playing the instrument. If vocal fold contact occurs frequently, playing should be restricted during the period of absolute voice rest.

Absolute voice rest also may be used for people who find moderation difficult and are unable to comply with recommendations for relative voice rest. Some people find it easier not to speak at all than to speak infrequently and softly. If a singer is psychologically unable to comply with recommendations for voice conservation, not speaking at all is better than not resting at all.

RELATIVE VOICE REST

Relative voice rest means using the voice only when absolutely necessary and phonating technically well while singing or speaking. In its most restrictive form, it is best summarized by Dr. Norman Punt's admonition: "Don't say a single word for which you are not being paid." Throughout the rest of this article, "voice rest" will mean relative voice rest or voice conservation unless "absolute voice rest" is stated specifically.

Voice rest is often a helpful adjunct in the treatment of many voice problems. For example, acute inflammatory or infectious laryngitis involves inflammation of the vocal folds. The redness seen by the laryngologist in examining the larynx is caused by dilated blood vessels. Laryngitis also involves other changes in the mucosal cover layer of the vocal folds and their lubrication. Singing or speaking in the presence of these alterations is accompanied by an increased risk of further injury. Decisions on how much to speak and sing with laryngitis depend on the severity of the illness, the importance and difficulty of vocal commitments, and the experience and proficiency of the vocalist. However, although absolute voice rest is generally not necessary, relative voice rest (to avoid further injury and facilitate healing) is always beneficial. Absolute voice rest is also not the proper treatment for vocal nodules, which are products of voice abuse (phonotrauma) and misuse. Although silence minimizes abuse temporarily, it is unnecessary; and lesions will return if absolute voice rest is used alone without addressing underlying, causal behaviors. Vocal nodules resolve with proper voice use and should be treated with voice modification and relative voice rest, including avoidance of vocally traumatic activities.

Between the extremes of absolute silence and unrestricted voice use, many modifications of vocal behavior are possible. Some techniques are practiced routinely by voice professionals, such as singers; others are utilized less frequently. The few suggestions for relative voice rest presented below should provide the laryngologist with practical and helpful guidelines for his or her professional vocalist patients.

Minimize Voice Use

Although this seems obvious, the importance of speaking or singing only when absolutely necessary cannot be overstressed. This is especially true for the singer or actor with laryngitis who is trying to get through a series of performances. He or she should avoid lengthy telephone conversations. It does not help to call all your friends on the telephone to tell them you have laryngitis! The advent of the cell phone has made this point even more important. It is too easy now to call anyone from anywhere. Often this occurs in envirmonments with loud background noise, such as a car. On the other hand, "texting" offers a good way to communicate while preserving the voice, and text-to-speech programs have been helpful for some patients on voice rest.

Staying away from school or work environments is helpful occasionally in avoiding the temptation—or necessity, depending on job requirements—to talk in these familiar surroundings. However, in most cases, this activity restriction should not be necessary for a disciplined, committed professional. It is reasonable for the singer or other voice professional to carry a note for his or her friends stating "I have laryngitis," even though the singer knows that limited speech is permissible. We sometimes even suggest wearing a small sign pinned to a lapel (Figure 1).

Warm Up Before Voice Use

Even during periods of voice rest, if the voice is used at all for speaking or for singing, a short period of controlled, soft vocal exercises first thing in the morning is invaluable. Even 5 minutes of gentle scales will allow a singer or other professional voice user to analyze, place, and control the voice before using it for speech. Besides improving vocal awareness, the physical benefits of such exercises are analogous to those experienced by runners and other athletes who stretch before exercising.

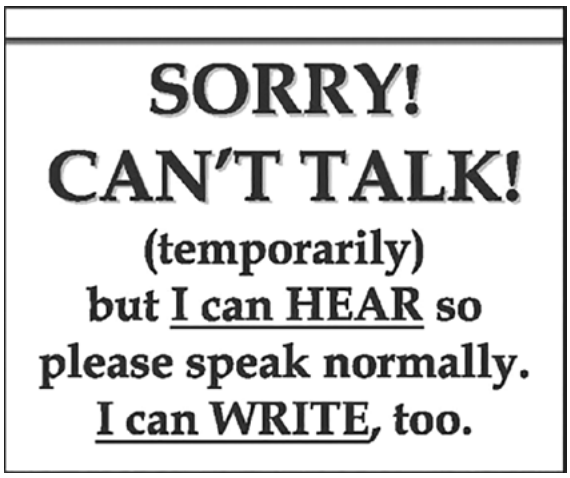

Figure 1. The authors suggest that voice professionals who are prescribed voice rest wear this sign.

Avoid Abusive Environments

In addition to staying away from places filled with friends with whom one is tempted to converse, the sick voice professional should also try to avoid talking or singing in noisy situations. Cars, airplanes, choirs, parties, bars, and other areas with excessive background noise lead a performer to speak or sing more loudly and with more effort than desirable. Vocalists should also avoid, as much as possible, environmental irritants such as dry heat, air conditioning, dusty areas (e.g., rehearsal rooms undergoing construction), and similarly abusive atmospheres.

Optimize General Health

Dehydration, fatigue, and other general medical conditions may affect the mucosal covering of the vocal folds, alter lubrication, and decrease vocal efficiency. Optimizing the physical conditions that are under the individual's control, such as sleep, hydration, and nutrition, is an important part of any voice conservation regimen.

Do Not Cancel Voice Lessons

The injured voice benefits greatly from supervision. Voice lessons for a person on relative voice rest may consist of only 10 to 15 minutes of supervised vocal exercise, but they help ensure proper placement and vocal technique. This may be especially useful if the vocal malady is associated with an upper respiratory infection and "stuffy ears." Such illnesses impair the performer's ability to hear him- or herself, and feedback from a teacher familiar with the individual's voice may be invaluable. Many singing teachers are also sensitive to their students' use of a speaking voice. An alert teacher may detect deficits in support, breath control, pitch, or other speaking habits that may produce voice fatigue and aggravate laryngeal injury.

In all circumstances singers should speak with the same control and awareness they use in singing, but this is particularly important during periods of illness. When performers must speak during an illness, the assistance of a speech-language pathologist who specializes in voice can be invaluable. An appropriately trained speech-language pathologist can provide information on vocal hygiene, voice conservation, and ways to identify phonotraumatic behaviors, voice abuse/misuse and eliminate them to prevent fatigue or injury, and can help teach singers to apply the same techniques of vocal efficiency in speech that they have learned in singing lessons.

Learn to Mark and Beware of Occult Phonotrauma

Various sources discuss common forms of phonotrauma that accompany choral conducting, cheerleading, voice teaching, singing with electric instruments, singing inappropriate or unfamiliar repertoires, and other conditions. Performers also often strain their voices unnecessarily even when they are trying consciously to protect them. "Marking," or modifying a rehearsal to conserve the voice, is a skill that is frequently neglected in routine voice teaching. A few particularly common errors are worth stressing. Many singers are under the mistaken impression that learning music (or "marking a rehearsal") by whistling is restful to the larynx. In fact, whistling is accompanied by vocal fold abduction and adduction and may include vocal fold contact. It is not a good form of voice rest. Furthermore, unconscious of his or her vocal activity while whistling, a singer is likely not to support the activity as he or she would while singing. Even merely listening or silently reading along with one's vocal lines during a rehearsal can be abusive in some people. Subvocalizing is common among readers, especially when they are reading musical vocal lines. Subvocalization may also occur when reading novels and even when listening to emotionally charged dramatic

material, such as at movies or theatrical productions. There are several ways a singer can determine whether he or she subvocalizes. Subvocalization can be observed in some people with a fiberoptic laryngoscope, but a visit to one's laryngologist for this diagnosis is usually not necessary. If a singer finds that his or her neck muscles are tight and the throat is tired at the end of a session of silent reading or listening, or if his or her reading speed decreases when he or she tries to read and hum a steady tone simultaneously, subvocalization should be suspected. Activities associated with this occult and unsupervised vocal activity should be avoided, especially during periods of voice rest.

In a well trained singer, marking is often accomplished best simply by singing reasonably softly in his or her normal voice, avoiding notes at both extremes of vocal range, and singing only essential portions of a rehearsal. Special care should be taken to practice good support technique, even when singing softly and low in the singer's vocal range. Because singers mark in the "easy" part of their voices, and because they are singing softly and trying to rest, there is a great temptation to rest abdominal and thoracic muscles as well. This is dangerous to vocal health. Proper marking requires technique as meticulously good as that practiced during unrestricted singing.

Cancel Nonessential Commitments

Singers and actors are steeped in the "show must go on" philosophy; however, when a vocal illness requires voice rest, the performer must exercise professional judgment in evaluating the risks and benefits of any commitment. Prioritize vocal obligations. Frequently, canceling rehearsals is necessary in order to allow safe performances later in the week. Occasionally, when laryngeal inflammation is severe, and when difficult performance material cannot be modified, it may even be necessary to cancel an important concert, play, or speaking engagement. Although this form of voice rest always feels like a disaster at the moment, the professional voice user must remember that his or her responsibility is to preserve the instrument in optimal health for as many years as possible. Risking a severe vocal injury is rarely justified.

For professional singers, voice rest is more complicated than simply keeping quiet. Like singing and speaking, voice rest is a vocal skill that should be understood by both the physician and patient, mastered, and used judiciously. The most important time during periods of absolute voice rest and relative voice rest is when the patient begins using his or her voice again. Patients also must be forewarned that abusing or misusing the voice after vocal fold surgery, vocal fold hemorrhage, laryngitis, or any other precursor to a prescription of vocal rest is detrimental to proper healing.

We suggest that a certified speech-language pathologist work with the laryngologist to determine candidacy for voice surgery. If the patient has not yet mastered techniques taught in voice therapy prior to surgery, then he or she may be prone to phonotrauma, voice abuse and misuse after surgery, and not enjoy optimal results. Using a protective, tentative voicing after insult to the mucosa is also deleterious to vocal fold healing, because it produces excess tension in the laryngeal musculature and may increase the risk of vocal fold scarring. In our practice, a speech-language pathologist is responsible for taking patients off voice rest, as well. To take the burden off the vocal folds and hasten the healing process, patients should be trained in resonant voice therapy. Use of properly supported "confidential voice" may be helpful in some patients. In our experience and in the opinions of other authors, a preventive, vocal health education program by a team of voice professionals is essential for the professional voice user.[13]

HIDDEN CONSEQUENCES OF VOICE REST

We noted earlier that injudicious prescription of voice rest may damage seriously a performer's career and reputation. This is especially true early in a professional career when cancellation of a concert may mean missing a career-making break. When deciding whether to cancel a performance, a careful risks-benefit analysis should be made. The consequences of cancellation for the performer may be apparent or subtle; consequences for the physician may be even less obvious. When a physician is uncertain regarding proper treatment recommendations, a prescription of voice rest may seem to the laryngologist to be the most conservative course of action. Clearly, a physician's first responsibility is to the individual patient. Nevertheless, it must be remembered that the physician accepts enormous responsibility

and liability when deciding to cancel a performance. For example, principal author (Sataloff) cared for a premier rock singer on world tour. The performer's medical problems necessitated cancellation of two performances during one week of a 12-month world tour. As a consequence, the singer's insurance company paid $250,000.00 for each concert, and substantial additional economic repercussions occurred due to loss of fees associated with rental of the sports stadium where the concert was to take place, monies for concessionaires, city police, parking attendants, cable television recording commitments, and other factors. Fortuitously, we had strobovideolaryngoscopic and objective voice laboratory documentation to substantiate the necessity for the voice prescription. Otherwise, it could have been difficult to defend.

NOTES

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Susan Cline—photo and bio unavailable.

Karen M. Lyons, MD, is Clinical Professor of Otolaryngology–Head and Neck Surgery at Drexel University College of Medicine. She graduated from the University of Pennsylvania School of Medicine in 1979 after having received her undergraduate degree in mathematics from the University of Connecticut. She completed her residency in otorhinolaryngology at the Hospital of the University of Pennsylvania in 1983 and became Assistant Professor of Otolaryngology at Harvard Medical School/Massachusetts Eye and Ear Infirmary. In 1985, she returned to Philadelphia and has practiced at Pennsylvania Hospital, Northeastern Hospital, Graduate Hospital, Thomas Jefferson University Hospital, and Hahnemann University Hospital. She has been associated with our practice since 1996. Her publications include works on evaluation of flap perfusion and on vocal fold physiology.

Jean Skeffington, MA, CCC-SLP, Voice Pathologist/Singing Voice Specialist, holds a Bachelor of Music degree in Vocal Performance and Music Education from the University of Rhode Island, and received a Master's degree in Communication Science and Disorders, Speech-Language Pathology, from the University of Pittsburgh in Pittsburgh, PA. Following her graduate studies, Jean completed a Fellowship in voice disorders at the UPMC Voice Center. She has contributed to published book chapters on vocal health and resonant voice therapy techniques, and is active in education and clinical voice research as clinical faculty at Michigan State University in the Communicative Sciences and Disorders Department.

A classically trained soprano, Jean has performed extensively throughout New England and internationally. She is equally at home on the concert, opera, and music theater stages. As an active member of the National Association of Teachers of Singing, Jean has taught on the voice faculty of the University of Rhode Island and Providence College. She maintains a private voice studio focused on vocal health and pedagogy, specializing

in the rehabilitation of injured performing voices, and her students are well represented nationally and internationally in the world of professional vocal performance.

Adam D. Rubin, MD, is a laryngologist, director of the Lakeshore Professional Voice Center, and Vice-President of the Lakeshore Ear, Nose & Throat Center (St. Clair Shores, MI). Dr. Rubin has had a lifelong passion for the human voice. Before attending medical school, he was a professional actor and singer, member of Actors Equity Association, Screen Actors Guild, and the American Federation of Television and Radio Artists. He has performed in musicals and plays at off-Broadway and regional theaters, as well as in a national tour. He is also a violinist and has dabbled in song writing.

Dr. Rubin started directing the Lakeshore Professional Voice Center in 2004, after completing a fellowship in Laryngology and Care of the Professional Voice under the direction of Robert T. Sataloff, MD, DMA, at the American Institute for Voice and Ear Research. He graduated *summa cum laude* from Yale College with degrees in Theater Studies and Economics. He received his medical doctorate from Harvard Medical School.

In addition to his clinical and artistic expertise, Dr. Rubin is active in voice research. He has written numerous scientific articles and book chapters, and is a frequent speaker at national and international meetings. He is the author of *The Vocal Pitstop: Keeping Your Voice On Track*, a concise, easy to understand handbook to provide the performer and serious voice user with the tools and tips necessary for voice and career preservation. Ron Livingston called his book, "the definitive owner's manual for the professional voice," and renowned singing teacher and voice pathologist Joan Lader described it as, "a book that should be on every singer's bookshelf."

Dr. Rubin is a fellow of the American Laryngological Association, Triological Society, American Broncho-Esophagological Society, and the American Academy of Otolaryngology. He has served as President of the Michigan Otolaryngological Society and remains on the board. He has academic appointments at the University of Michigan, Michigan State University, and the Oakland University William Beaumont School of Medicine. He loves teaching and mentoring medical students and residents. Most importantly, he is a loving husband and father of two wonderful children.

One of Dr. Rubin's biggest joys is hosting an annual World Voice Day concert in which he and many of his patients sing and celebrate voice recovery. The concert is held every April. You can view many of the performances on The Lakeshore Professional Voice Center YouTube video channel: https://www.youtube.com/user/lakeshoreprofvoice.

[Antonio:]
Whereof what's past is prologue; what to come
in yours and my discharge.

William Shakespeare, *The Tempest*
Act II, Scene 1