

Common Diagnoses and Treatments in Professional Voice Users

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Common ailments that represent mere inconvenience for the general population may be disabling to the professional voice user, especially a classical singer. It is helpful for laryngologists to understand the diagnosis, consequences, and management of various conditions encountered frequently in clinical care of voice patients. Careful attention to the special history and physical examination employed with professional singers usually allows detection of even subtle organic derangements.^{1,2} Imaginary complaints are rare among serious professional voice users; the inability to "find anything" should make the physician wary of the evaluation rather than of the legitimacy of the patient's complaint.

Reflux Laryngitis

Gastric reflux laryngitis is endemic among singers. They perform without eating because a full stomach interferes with necessary abdominal support. In addition, they usually sing in the evening. Consequently, singers arrive home late at night, eat a large meal, and go directly to bed. This lifestyle combines with the stress of a performing career to produce a disproportionately high incidence of this condition. The most typical symptoms are hoarseness in the morning, prolonged warm-up time, halitosis and a bitter taste in the morning, a feeling of a "lump in the throat," frequent throat-clearing, chronic irritative cough, and frequent tracheitis or tracheobronchitis. Any or all of these symptoms may be present. Physical examination usually reveals cherry red arytenoids. A barium esophagram may provide additional information but is not needed routinely. However, if a patient complies strictly with treatment recommendations and does not show marked improvement within a month, a barium esophagram should be performed. Either the patient has a significant underlying gastrointestinal problem or the diagnosis is incorrect. Bulimia should be considered in the differential diagnosis in such cases.

The mainstays of treatment for reflux laryngitis are elevation of the head of the singer's bed (not just sleeping on pillows), antacids, and avoidance of eating for three to four hours before going to sleep. This is often difficult for singers, but if they are counseled about minor changes in eating habits (such as eating larger meals at breakfast and lunch), they can usually comply. Avoidance of alcohol and coffee is beneficial. Cimetidine and ranitidine also may be helpful. However, cimetidine has among its complications a significant incidence of male infertility. In this generally young

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patient population, it is probably best to avoid this drug, especially since the complication has not been reported with ranitidine.

Voice Abuse in Singing

The most common technical errors in singing involve excessive muscle tension in the neck and laryngeal muscles, inadequate abdominal support, and excessive volume. The physical examination allows the physician to observe these conditions. However, there are other common forms of voice abuse. Inadequate preparation from limited vocal training for a given role, limited practice, or insufficient rehearsal of a difficult piece result in increased vocal strain. These circumstances are common in competitive academic environments and in young professionals who accept too many concert commitments, attempting to build their careers. Misclassification is also abusive and common. Singers are frequently unhappy with the limitations of their voices and try to test their limits. At one time or another, most baritones try to prove they are tenors, for example. Such attempts are frequently harmful and may result in symptoms that bring the singer to the physician's attention.

When abuse of the singing voice is diagnosed, the physician must remember the limits of his expertise or responsibility. If the physician is trained in singing and notices a minor technical error such as isolated excess muscle tension in the tongue or deficiency of abdominal support, this may be pointed out. However, in all cases the singer should be referred to his voice teacher for management of these problems. Even when there is a medical cause, a good voice teacher will be helpful in assuring nonabusive technique if the singer continues to vocalize. Physicians should be aware of the difference between a *singing teacher* and a *voice coach*. *Singing teachers* are responsible for technical and anatomical development of the voice. *Voice coaches* teach repertoire and style but are not primarily responsible for voice technique. It is common for singers to have both. However, training with only a voice coach is insufficient, especially for the young singer (classical or popular).

Abuse of the singing voice is particularly common among "pop" musicians who are required to sing with loud, electric instruments, in concert halls not designed for musical performance, or outdoors. In addition to receiving voice training, these performers must be cautioned to use monitor speakers to direct the sound of their voices toward themselves loudly enough to provide auditory feedback while performing. The pop musician may be reluctant to receive

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voice training, fearing that it will change vocal quality to an operatic sound. To assure compliance, the physician should correct this common misconception, explaining that good singing technique can be applied to any singing style and is designed to prevent injury.

Voice Abuse in Speaking

Frequently, the finest technical singers pay no attention to speaking techniques. Speaking in loud environments such as cars and airplanes is particularly abusive, as are backstage greetings, post-performance parties, choral conducting, cheerleading, and voice teaching. If one is properly trained, all of these activities can be done safely. However, most singers have little or no training for the speaking voice. If voice abuse is caused by speech, treatment should be deferred to a speech pathologist. In many cases, training the speaking voice will benefit the singer greatly, not only improving speech but also helping singing technique, and the physician should not hesitate to recommend such training. However, such training should be performed by an expert speech pathologist who specializes in voice. Many speech pathologists who are well trained in swallowing rehabilitation, articulation therapy, and other techniques are not experts in voice therapy. Likewise, in selected instances, specialized singing training may be helpful to the voice patient who is not a singer. Early singing training teaches relaxation techniques, increases strength in the abdomen, and develops muscle strength and coordination throughout the vocal tract. The author uses a team approach that coordinates the efforts of a laryngologist, speech pathologist, and a singing teacher who specializes in the injured voice.

Vocal Nodules

Nodules are caused by voice abuse and are a dreaded malady of singers. Occasionally, laryngoscopy reveals asymptomatic vocal nodules that do not appear to interfere with voice production. Some famous and successful singers have had untreated vocal nodules. If the nodules are asymptomatic, they should not be disturbed. However, in most cases nodules result in hoarseness, breathiness, loss of range, and vocal fatigue. They may be due to abuse of the speaking voice, the singing voice, or both. Voice therapy should always be tried as the initial therapeutic modality and will cure the vast majority of patients. Even apparently large, fibrotic nodules often regress, disappear, or become asymptomatic with six to twelve weeks of speech therapy. Even in those who will eventually need surgical excision of the nodules, preoperative voice therapy is essential to prevent recurrence.

The use of the laser remains controversial among laryngologists who perform phonosurgery. There is some indication that the laser results in longer healing time and higher incidence of vocal fold scar and poor voice. Other active laryngologists believe that if high wattage and short duration are used, these complications should not occur more often than without the laser. At the present time,

the author prefers traditional instruments for excision of vocal nodules that remain symptomatic after therapy (although not for some other lesions). In any case, it is essential that the excision be superficial. These lesions are not malignant (although tissue should be obtained for histologic study regardless of whether or not a laser is used), and there is no need to cut a divot out of the vocal fold. If the lesions are excised to a level that is even with the vocal fold edge, and the lamina propria is disturbed as little as possible, scarring will be minimized. This principle holds for use of laser as well as for traditional instrumentation.

Vocal Polyps

Vocal polyps are usually single lesions. Often, microscopic evaluation reveals a feeding vessel on the focal fold (usually superior surface). Such lesions may regress spontaneously. However, often they require excision. A trial of speech therapy, low-dose steroids, and reevaluation in four weeks has produced surprising resolution in some patients. After the lesion has been excised with minimal disruption of the mucosa along the leading edge of the vocal fold, cauterization of the feeding vessel with one-watt laser bursts may help to prevent recurrence. This technique is also useful in recurrent vocal fold hematomas.

Vocal Fold Cysts

Submucosal lesions of the vocal fold such as cysts usually do not resolve spontaneously. They may be excised using a small, superficial incision along the superior edge. Superficial submucosal dissection allows removal of the cyst without disruption of the leading edge.

Reinke's Edema

The "elephant ear" floppy vocal fold appearance of Reinke's edema is uncommon among classical professional singers but is seen more frequently among pop singers, radio and sports announcers, attorneys, and other professional voice users. It is nearly always associated with cigarette smoking, although other factors such as hypothyroidism may be contributory. If it does not resolve after all irritants have been removed and voice technique has been modified, surgery may be necessary. Only one vocal cord should be operated upon at a sitting. The vocal fold may be incised along its superior surface and the edematous material removed with a fine suction. This often produces a very satisfactory voice, and it may be unnecessary to operate upon the contralateral vocal cord even at a later date. Caution must be exercised in treating this condition, particularly in professional voice users. In an actor or radio announcer, for example, the edema may be partially responsible for the performer's voice "signature." Restoring the voice to a satisfactory cosmetic appearance and "normal" sound may damage or end a performer's career.

Upper Respiratory Infection Without Laryngitis

If the laryngeal examination shows no abnormality, a singer with a "head cold" should be permitted to sing if he feels well enough to perform. However, he should be advised not to try to duplicate his usual sound but, rather, to accept the insurmountable alteration caused by the change in his supraglottic vocal tract. He must sing "by feel" rather than "by ear." The decision as to whether it is advisable professionally for him to appear under those circumstances

rests with the singer and his musical associates. The better the vocalist is as a technician, the more likely he is to be able to modify his vocal technique and performance materials to compensate for this or other impairments. The physician should avoid prescribing medications that may worsen the singer's plight such as antihistamines, which produce excessive dryness. Aspirin is also contraindicated in this condition and in singers in general. Its anticoagulant properties increase the risk of vocal fold hemorrhage. This is of particular concern in the presence of laryngitis with its associated vascular dilation and fragility.

Laryngitis with Serious Vocal Fold Injury

Hemorrhage into a vocal fold and mucosal disruption are contraindications to singing. When these are observed, the therapeutic course includes strict voice rest in addition to correction of any underlying disease. Severe hemorrhage or mucosal injury may lead to scarring that may result in permanent alterations in vocal vibratory function and voice quality. In rare instances, surgical intervention may be necessary. Ideal management of hematomas is still undetermined. In selected cases in which early spontaneous resolution does not occur, evacuation through a small incision on the superior edge of the vocal fold may be preferable to the risks of an organized hematoma. The potential gravity of these conditions must be stressed, for singers are generally reluctant to cancel an appearance. However, patient compliance is essential when serious damage has occurred.

Laryngitis Without Serious Damage

Mild to moderate edema and erythema of the vocal folds may result from infection or noninfectious causes. In the absence of mucosal disruption or hemorrhage, laryngitis is not an absolute contraindication to voice use. Noninfectious laryngitis commonly occurs in association with excessive voice use in pre-performance rehearsals. It may also be caused by other forms of voice abuse and by mucosal irritation due to allergy, smoke inhalation, recent travel, and other causes. Mucus stranding between the anterior and middle thirds of the vocal folds is also indicative of voice abuse. Laryngitis sicca is associated with dehydration, dry atmosphere, mouth breathing, and antihistamine therapy. Deficiency of lubrication causes irritation and coughing, and results in mild inflammation. If there is no pressing professional need for performance, inflammatory conditions of the larynx are best treated with relative voice rest in addition to other modalities. However, in some instances singing may be permitted. The singer should be instructed to avoid all forms of irritation and to rest the voice at all times except during warm-up and performance. A short voice lesson should be encouraged to assure optimum technique. Hydration is essential. The singer may be instructed to monitor hydration by being certain that his urine is pale in color. Under important performance circumstances, steroids are particularly helpful in treating this condition. Usually, secretions are scant rather than excessive. However, if mucosal secretions are copious, low-dose antihistamine therapy may be beneficial, but it must be prescribed with extreme caution, and probably should not be used shortly before a performance unless the singer has had previous experience with the specific antihistamine.

Infectious laryngitis may be associated with bacteria or viruses. Subglottic involvement is frequently indicative of

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a more severe infection, which may be difficult to control in a short period of time. Indiscriminate use of antibiotics must be avoided. However, when the physician is in doubt as to the cause of the laryngitis and when a major performance is imminent, vigorous antibiotic therapy is warranted. In this circumstance, the damage caused by allowing progression of a curable condition is greater than the damage that might result from a course of therapy for an unproven microorganism. When antibiotics are used, high doses to achieve therapeutic levels rapidly are recommended, and a full seven to ten day course should be administered. Although ampicillin is used commonly, amoxicillin may achieve higher tissue levels more rapidly and may be advantageous, particularly when therapy is instituted shortly before a performance. Similar considerations should be taken into account when selecting other drugs. When a major concert is not imminent, indications for therapy are the same as for the non-singer. Except under extraordinary circumstances, use of steroids should be avoided when obvious infection is present.

Voice rest is an important therapeutic measure in any case of laryngitis. When there are no pressing professional commitments, voice rest is a safe and conservative therapeutic intervention. *Relative voice rest* means using the voice only when absolutely necessary, such as during a performance. The performer must be instructed not to talk, especially in cars or other noisy environments, to avoid throat clearing, and to speak softly rather than whisper when vocalization is essential. Singers should also be warned that vocalization occurs during whistling through the lips and is not a form of voice rest. *Absolute voice rest* means silence with use of a writing pad. This is never necessary for laryngitis, although it may be used in patients who are psychologically better able to remain silent than to moderate their voice use. It is almost never appropriate for much more than a week and is recommended as therapy only in cases of mucosal disruption, vocal fold hemorrhage, or following vocal fold surgery. Even under these circumstances, its use is controversial; some excellent laryngologists with vast experience in professional singers do not recommend absolute voice rest even following phonosurgery.

Steam inhalation to deliver moisture and heat to the vocal folds and tracheobronchial tree may be helpful. Nasal irrigations are used by some people but have little proven value. Ultrasonic treatments, local massage, and psychotherapy and biofeedback directed at relieving anxiety and decreasing muscle tension may be adjuncts to a broader therapeutic program. However, psychotherapy and biofeedback, in particular, must be expertly supervised, if used at all.

Voice lessons given by an expert teacher are invaluable. Even when there is an obvious organic abnormality, referral to a voice teacher is appropriate, especially for younger singers. There are numerous "tricks of the trade" that permit a singer to safely overcome some of the disabilities of mild illness.

There is no agreement regarding the use of topical medications in singers. In the case of dehydration, oral hydration may be supplemented with a topical mist of saline, or 5% propylene glycol in a physiologically balanced salt solution. Addition of harmless mucolytic agents to the topical mist has also proved useful in some circumstances. Water or saline delivered through a vaporizer or steam generator is often effective. However, topical hydration is only a supplement to vigorous oral hydration, which is the mainstay of therapy. In select cases, oxymetazoline hydrochloride (Afrin) may also be used topically, especially if there is an acute inflammatory or allergic reaction immediately preceding a performance. If time permits, intramuscular or oral steroids are preferable. Sprays that contain even a mild anesthetic, such as 0.5% diphenhydramine hydrochloride (Benadryl), should be avoided. They are dangerous because they deprive a singer of pain sensation—a valuable physiologic safeguard. Though it may allow performance, anesthesia of the vocal fold predisposes to serious vocal fold injury, which the singer may not recognize until the anesthesia has worn off. If there is sufficient vocal fold discomfort or “tickle” to necessitate such therapy, vocal performance should not be allowed.

Allergy

Mild allergies are more incapacitating to professional voice users than to others because of their effect on the mucosal cover layer. If a singer has a short period of annual allergy and is able to control the symptoms well with antihistamines that do not produce disturbing side effects, this approach is reasonable. When used, mild antihistamines in small doses should be tried. It is often necessary to “experiment” with several antihistamines before finding a suitable balance in a singer between therapeutic effect and side effects. The adverse side effects may be counteracted to some extent with iodinated glycerol (Organidin, Wallace). This mucolytic expectorant helps to liquefy mucus and increases the output of thin respiratory tract secretions. Entex-LA is a useful expectorant and vasoconstrictor that increases and thins mucosal secretions. Guaifenesin (Robitussin, Robins) is also an excellent mucolytic expectorant. However, medications produce sufficient difficulty for professional voice users to warrant allergic evaluation and hyposensitization therapy in many patients who might not need to go through this process if they were in other professions.

Hypothyroidism

The human voice is particularly sensitive to endocrinologic changes. Many of these are reflected in the alterations of fluid content beneath the laryngeal mucosa. This alters the bulk and shape of the vocal folds and results in voice change. Hypothyroidism³⁻⁵ is a well recognized cause of voice disorders, although the mechanism is not well understood. Hoarseness, vocal fatigue, muffling, loss of range, a feeling of a lump in the throat, and a sensation of “a veil over the voice” may be present even with mild hypothyroidism. Even when thyroid function test are within the low-normal range, the diagnosis of hypothyroidism should be entertained, especially if thyroid-stimulating hormone levels are in the high-normal range or are elevated. A therapeutic trial of thyroid replacement is reasonable under these circumstances, especially if the patient is overweight

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or has other stigmata of borderline thyroid function. Thyrotoxicosis may result in similar voice disturbances.⁶

Laryngopathia Premenstrualis and Laryngopathia Gravidarum

Voice changes associated with sex hormones are encountered often in clinical practice. Although occasionally these changes may be significant in males, voice problems related to sex hormones are seen most commonly in female performers. Most ill effects occur in the immediate premenstrual period and are known as laryngopathia premenstrualis. This common condition is caused by physiologic, anatomic, and psychologic alterations secondary to endocrine changes. The vocal dysfunction is characterized by decreased vocal efficiency, loss of the highest notes in the voice, vocal fatigue, slight hoarseness, and some muffling of the voice. It is often more apparent to the singer than to the listener. Submucosal hemorrhages in the larynx are common.⁷ In many European houses, singers are excused from singing during the premenstrual and early menstrual days by contract “grace days.” This practice is not followed in the United States. Although ovulation inhibitors may mitigate some of these symptoms,⁸ in some women birth control pills deleteriously alter voice range and character even after only a few months.⁹⁻¹² These changes are usually reversible. When oral contraceptives are used, the voice must be monitored closely. Under crucial performance circumstances, oral contraceptives may be used to alter the time of menstruation, but this practice is justified only in the most extraordinary situations.

Pregnancy frequently results in voice alterations known as laryngopathia gravidarum. The changes may be similar to premenstrual symptoms or may be perceived as desirable changes. In some cases, alterations produced by pregnancy are permanent.^{13,14}

Singers frequently obtain diuretics from their gynecologists in order to help treat “fluid loading” and to relieve premenstrual voice dysfunctions. However, the submucosal fluid in the larynx is protein-bound,¹⁵ and diuretics are effective in diuresing only free fluids. Consequently, they result in relative dehydration with undesirable alterations in the mucosal surface but persistently boggy vocal folds. There is no safe medication available for routine use to counteract the normal physiologic effects of the menstrual cycle.

Although hormonally induced changes in the larynx and respiratory mucosa secondary to menstruation and pregnancy are discussed widely in the literature, insufficient attention has been paid to the important alterations in abdominal support. Muscle cramping associated with menstruation causes pain and hinders abdominal support. Abdominal distention during pregnancy also interferes with abdominal musculature. Any singer whose abdominal support is compromised should be discouraged from singing until the abdominal disability is resolved.

Poor General Health

As an athletic activity, singing requires reasonably good general health and physical conditioning. Abdominal and

respiratory strength and endurance are particularly important. If a professional voice user becomes short of breath from climbing two flights of stairs, he certainly does not have the physical stamina necessary to properly support a short recital, let alone a strenuous operatic production. This deficiency usually results in abusive vocal habits used in vain attempts to compensate for the deficiencies. General illnesses such as anemia, mononucleosis, or other diseases associated with malaise may also impair the ability of vocal musculature to recover rapidly from heavy use and may also be associated with alterations of mucosal secretions. Other systemic illnesses may also be responsible for voice complaints, particularly if they impair abdominal muscle function. For example, diarrhea and constipation that prohibit sustained abdominal contraction may be contraindications to singing. An extremity injury such as a sprained ankle may alter a singer's posture, interfering with customary abdominothoracic support. Singers are often unaware of this problem and develop abusive, hyperfunctional compensatory maneuvers in the neck and tongue musculature. This may produce voice complaints such as vocal fatigue and neck pain that bring the performer to the physician's office.

Aging

Advanced age produces normal changes throughout the voice-producing mechanism. Abdominal and general muscle tone decrease, lungs lose elasticity, the thorax loses distensibility, the mucosa of the vocal tract atrophies, mucus secretions change character, nerve endings are reduced in number, and psychoneurologic functions differ. The larynx itself loses muscle tone and bulk and may show depletion of submucosal ground substance in the vocal fold. The laryngeal cartilages ossify and the joints become arthritic and stiff. The hormonal environment changes. The effects of the changes of aging seem to be more pronounced in female singers. Excellent male singers are more likely to extend their careers into their seventies.^{16,17} However, some degree of breathiness and other aging changes should be expected in most elderly patients. Estrogen replacement may forestall by many years the appearance of disturbing change in postmenopausal singers; however, it should not be given alone. Sequential replacement is most physiologic. Under no circumstances should androgens be given to female singers, even in small amounts, if there is any therapeutic alternative.¹⁸⁻²³ Androgens cause unsteadiness of the voice, rapid changes of timbre, and lowering of the fundamental frequency. This masculinization is similar to the changes observed during male voice maturation at puberty. The changes are irreversible. Preparations with progestins should be used instead of androgen preparations whenever possible. In rare instances, androgen may be produced by pathologic conditions such as ovarian or adrenal tumors, and voice alterations may be the presenting symptoms.

Substance Abuse

The list of substances ingested, smoked, or "snorted" by professional performers is disturbingly long. Whenever possible, performers should be educated about the deleterious effects of such habits upon their voices and upon the longevity of their careers. The harmful effects of tobacco smoke on mucosa are indisputable. It causes erythema, edema, and generalized inflammation throughout the vocal tract. Mar-

ijuana produces a particularly irritating, unfiltered smoke that is inhaled directly, causing considerable mucosal response. Smoking should not be permitted in the serious singer. Singers who are required to perform in smoke-filled environments may suffer the same effects. In some situations, this may be helped by placing a quiet fan behind the singer to direct the smoke out toward the audience and away from the stage.

A history of alcohol abuse suggests the probability of poor vocal technique. Intoxication results in incoordination and decreased awareness, which undermine vocal discipline designed to optimize and protect the voice. The effect of small amounts of alcohol is controversial. Although many experts oppose it because of its vasodilatory effect and consequent mucosal alteration, many singers do not seem to be adversely affected by limited quantities of alcohol such as a glass of wine with dinner preceding a performance. However, performers should avoid specific types of wine or beer that cause nasal congestion or rhinorrhea. Food allergies to these substances are common and may interfere with vocal performance. Valium, barbiturates, narcotics, and other drugs that alter sensorium or fine motor control should also be prohibited. Propranolol should also not be used for the reasons discussed above, unless it is necessary for the treatment of a cardiovascular condition. Even then, good alternative medication should be considered.

Cocaine use is increasingly common, especially among pop musicians. It can be extremely irritating to the nasal mucosa, causes marked vasoconstrictions, and may alter sensorium, resulting in decreased voice control and a tendency to vocal abuse. In addition, small amounts of cocaine may reach the larynx, resulting in vocal fold anesthesia and predisposing to serious injury.

Singers frequently borrow drugs from each other and unwittingly abuse prescription medications as well, particularly antihistamines, antibiotics, and diuretics. Singers usually know better and are reluctant to admit to this behavior. Antihistamine abuse should be sought specifically, particularly in patients who appear dry or dehydrated without a history of recent travel, excessive work, or other obvious reason. Before starting a singer on an antibiotic, he should be asked specifically if he has taken any antibiotics on his own or through another physician. Frequently, a singer will have used medication for a day or two immediately preceding a performance, improved the sore throat, and forgotten about the medication as soon as the performance was over. He is apt to present at the physician's office a few days thereafter infected with a resistant organism.

Anxiety

The psychological constitution of a singer affects the vocal mechanism directly. The voice is an exquisite messenger of emotion. A simple "hello" from a family member over the telephone is enough to reveal whether the message is good news or tragedy. The nervous system mediates fine motor control. Overwhelming emotion often results in a tremor of the voice. The autonomic nervous system controls mucosal secretions and other functions critical to voice production. Anxiety is a normal concomitant of a performer's profession, particularly pre-performance anxiety (stage fright). Under ordinary circumstances, singers, actors, and other professional voice users learn to control their anxiety. In fact, many good performers feel that this anxiety is es-

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sential to the "edge" of their performers. They learn to incorporate it into the energy and emotion they must convey to their audiences. In young performers, extreme anxiety may merely reflect insufficient training in this aspect of a performance career. In the established performer, occasional extraordinary circumstances impair the ability to control emotions. Singers frequently present to the physician with "hoarseness," vocal fatigue, or change in voice quality.

When the principal cause of voice dysfunction is anxiety, the physician can often accomplish a great deal with gentle reassurance that there is no vocal cord pathology and by stating that the diagnosis is reaction to anxiety. The singer should be counseled that anxiety is normal. Recognition that this is the principal problem generally allows the performer to overcome it. Tranquilizers and sedatives are rarely necessary and are undesirable because they interfere with awareness and fine motor control, the primary foci of vocal training.

Propranolol is another popular drug among musicians for stage fright. Although it is effective in reducing pre-performance anxiety, it should not be used except under the very rarest circumstances. In addition to having potential cardiovascular and pulmonary side effects (particularly in asthmatics), its beta-blocking action impairs the ability to increase heart rate.²⁴ As with any other athletic endeavor, optimal and safe singing and acting require unimpaired physiologic response to physical demands of performance.

If a performer is so incapacitated by stage fright that he requires any ingested substance routinely in order to perform the daily activities of his chosen profession (alcohol, diazepam, propranolol, or others), this should be viewed as symptomatic of a more serious underlying problem. In such cases, the underlying problem, not merely the symptoms, should be treated, and counseling or psychotherapy may be indicated. However, when caring for itinerant singers who will only be in a laryngologist's city for a matter of days or weeks, no attempt should be made to abruptly change medication or habits. The laryngologist should contact the performer's home-town laryngologist or primary physician to confirm the medication and dose and to discuss plans for long-term management of the performer's problem.

In selected instances, stress may overwhelm even the best and most stable performers. If the stress is exogenous (produced by theatre management, teachers, parents, etc.), direct physician intervention with the stress-producing person may be highly therapeutic. Conveying "doctor's orders" directly to theatre management when a singer needs to miss rehearsals or performances takes a great deal of pressure off the performer and puts the onus of cancellation on the physician's broader shoulders. Even in the world-class, premiere performers, this can be extremely helpful.

When the anxiety or stress is associated with more serious psychiatric problems, a psychiatric consultant may recommend psychotropic medications. Their use takes precedence over vocal considerations, of course. However, many such drugs produce dryness, and some produce slight tremor that may be reflected in the voice.

Summary

There are many other diagnoses and treatments of particular importance in caring for professional voice users. Those discussed are among the most common. The exacting demands of a professional singer's career, his acute ability to analyze his body's condition, and his professional athlete's need for a nearly perfect result make the professional vocalist a most challenging, fascinating, and gratifying patient. Expert care requires continued interdisciplinary education and cooperation, and creative imagination.

The author is indebted to The C.V. Mosby Company, The Journal of Otolaryngology, and W.B. Saunders Company for allowing him to extract material from their publications. The author also appreciates the assistance of Barbara-Ruth Roberts, R.N., Ruth Giduck, Helen Caputo, and Valerie Ragsdale for their help in preparing this manuscript.

References

1. Sataloff RT: Efficient history taking in professional singers. *Laryngoscope*, 94:111-114, 1984.
2. Sataloff RT: Professional singers: the science and art of clinical care. *Am J Otolaryngol* 2:251-266, 1981.
3. Ritter FN: The effect of hypothyroidism on the larynx of the rat. *Ann Otol Rhinol Laryngol* 67:404-416, 1964.
4. Ritter FN: Endocrinology. In Paparella M, Shumrick D (eds): *Otolaryngology*, vol. 1. Philadelphia, W.B. Saunders, 1973, pp 727-734.
5. Gupta OP et al: Nasal pharyngeal and laryngeal manifestations of hypothyroidism. *Ear Nose Throat J* 56:10-21, 1977.
6. Malinsky M et al: Etude clinique et électrophysiologique des alternations de la voix au cours des thyrotoxioses. *Ann Endocrinol (Paris)* 38:171-172, 1977.
7. Lacina V: Der Einfluss der Menstruation auf die Stimme und ihre Beeinflussung durch Ovulationshemmer. *Folia Phoniatri* 24:259-277, 1972.
8. Wendler J: Zyklusabhängige Leistungsschwankungen der Stimme und ihre Beeinflussung durch Ovulationshemmer. *Folia Phoniatri* 24:259-277, 1972.
9. Dordain M: Etude Statistique de l'influence des contraceptifs hormonaux sur la voix. *Folia Phoniatri* 24:86-96, 1972.
10. Pahn V, Goretzlehner G: Stimmstörungen durch hormonale Kontrazeptiva. *Zentralbl Gynekol* 100:341-346, 1978.
11. Schiff M: "The pill" in otolaryngology. *Trans Am Acad Ophthalmol Otolaryngol* 72:76-84, J-F 1968.
12. Brodnitz F: Medical Care Preventive Therapy (panel). In Lawrence V (ed): *Transcripts of the Seventh Annual Symposium on Care of the Professional Voice*. New York, The Voice Foundation, 3:86, 1978.
13. Flach M, Schwickardi H, Simen R: Welchen Einfluss haben Menstruation und Schwangerschaft auf die ausgebildete Gesangsstimme? *Folia Phoniatr* 21:199-210, 1968.
14. Deuster, CV: Irreversible Stimmstörung in der Schwangerschaft. *HNO* 25:430-432, 1977.
15. Schiff M: Comment at the Seventh Symposium on Care of the Professional Voice. New York, The Juilliard School, June 15 and 16, 1978.
16. von Leden H: Speech and hearing problems in the geriatric patient. *J Am Geriatr Soc* 25:422-426, 1977.
17. Ackerman R, Pfan W: Gerotologische Untersuchungen zur Störnepanfalligkeit der Sprechstimme bei Berufssprechern. *Folia Phoniatri* 26:95-99, 1974.
18. Damste PH: Virilization of the voice due to anabolic steroids. *Folia Phoniatri* 16:10-18, 1964.
19. Danste PH: Voice changes in adult women caused by virilizing agents. *J Speech Hear Disord* 32:126-132, 1967.
20. Saez S, Françoise S: Récepteurs d'androgènes: mise en évidence dans la fraction cytosolique de muqueuse normale et d'épithéliomas pharyngo-larynges humains. *Centre Regional Academic Science (Paris)* 280:935-938, 1975.
21. Vuorenkoski V, et al: Fundamental voice frequency during normal and abnormal growth, and after androgen treatment. *Arch Dis Child* 53:201-209, 1978.
22. Arndt HJ: Stimmstörungen nach Behandlung mit androgenen und anabolen Hormonen. *Munch Med Wochenschr* 116:1715-1720, 1974.
23. Bourdial J: Les troubles de la voix provoqués par la thérapeutique hormonale androgène. *Ann Otolaryngol (Paris)* 87:725-734, 1970.
24. Gates GA, Saegert J, Wilson N, et al: Effects of beta blockade on singing performance. *Ann Otol Rhinol Laryngol* 94:570-574, 1985.