

Hoarseness in Adults

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Numerous conditions can cause hoarseness, ranging from simple inflammatory processes to more serious systemic, neurologic, or cancerous conditions involving the larynx. Evaluation of a patient with hoarseness includes a careful history, physical examination, and in many cases, laryngoscopy. Any patient with hoarseness lasting longer than two weeks in the absence of an apparent benign cause requires a thorough evaluation of the larynx by direct or indirect laryngoscopy. The management of hoarseness includes identification and treatment of any underlying conditions, vocal hygiene, voice therapy, and specific treatment of vocal cord lesions. Vocal hygiene education is an integral aspect of the treatment of hoarseness in most cases. Referral to a speech-language pathologist for voice therapy may be particularly helpful for patients whose occupation depends on singing or talking loudly or for prolonged periods. Voice therapy is an effective method for improving voice quality and vocal performance in patients with nonorganic dysphonia and for treating many benign pathologic vocal cord lesions. Referral for surgical or other targeted interventions is indicated when conservative management of vocal cord pathology is unsuccessful, when dysplasia or carcinoma is suspected, or when significant airway obstruction is present. (*Am Fam Physician*. 2009;80(4):363-370. Copyright © 2009 American Academy of Family Physicians.)

Hoarseness generally refers to an abnormal vocal quality that may be manifested as a voice that sounds breathy, strained, rough, raspy, tremorous, strangled, or weak, or a voice that has a higher or lower pitch. Although hoarseness is a common symptom in patients seen by family physicians, incidence data are largely unavailable. It may be the presenting symptom, but more commonly it is one of many other symptoms, such as cough, difficulty breathing or swallowing, sore throat, or fever.

Anatomy and Function of the Larynx

The larynx is a complex structure that serves protective, respiratory, deglutition, and vocalization functions. Extending from the base of the tongue to the trachea, it consists of an underlying cartilaginous, bony, and membranous framework with an overlying mucosal lining (*Figure 1*). The framework of the larynx is formed by the cricoid, thyroid, arytenoid, epiglottic, corniculate, and cuneiform cartilages, interconnected by ligaments and membranes, and moved by extrinsic and intrinsic muscles. The vocal cords (or vocal folds) are primarily responsible for the

production of sound. They are membranous structures attached to the arytenoid and thyroid cartilages, and stretched across the larynx. The larynx is innervated by the superior and recurrent laryngeal nerves, which are branches of the vagus nerve.

Sounds are produced by air flow from the lungs causing the vocal cord epithelium to vibrate; the resultant fluctuations in air pressure produce sound waves. To generate sounds, the vocal cord edges must be brought close enough together to vibrate from the flow of air through the larynx. The arytenoid cartilages and attached muscles are responsible for movement and tension of the vocal cords. Resonance of the sound waves is modified by the position and shape of the lips, jaw, tongue, soft palate, and other speech organs.

Causes of Hoarseness

Causes of hoarseness include pathologic changes from irritants and inflammatory processes, neuromuscular and psychiatric conditions, systemic disorders, and neoplasms. The more common and important of these conditions are listed in *Table 1*. Many of these processes result in laryngoscopic

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	References
Any patient with hoarseness lasting longer than two weeks in the absence of an apparent benign cause should have a thorough examination of the larynx by direct or indirect laryngoscopy.	C	19, 20
If laryngopharyngeal reflux is suspected, consider a trial of a high-dose proton pump inhibitor for three or four months.	B	2-4, 21
Vocal hygiene education is effective for treating patients with hoarseness.	B	22, 23
Voice therapy is effective for improving voice quality and vocal performance in patients with nonorganic dysphonia.	A	24
Voice therapy is effective for treating vocal cord nodules, polyps, cysts, and granulomas.	B	25-27

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <http://www.aafp.org/afpsort.xml>.

changes that can aid in establishing a definitive diagnosis. However, many of the pathologic changes are associated with more than one of these underlying causes (Table 2).

INFECTIOUS AND INFLAMMATORY

Acute laryngitis is a common, self-limited condition that typically presents with hoarseness. Short-term vocal abuse

and upper respiratory infection (URI) are the most common causes of acute laryngitis. Less common infectious causes of hoarseness include fungal and bacterial infections.¹ In most cases, other than in acute laryngitis, the hoarseness is only one of many symptoms and is not the presenting symptom. Upper respiratory allergies often involve the larynx, resulting in hoarseness, along with

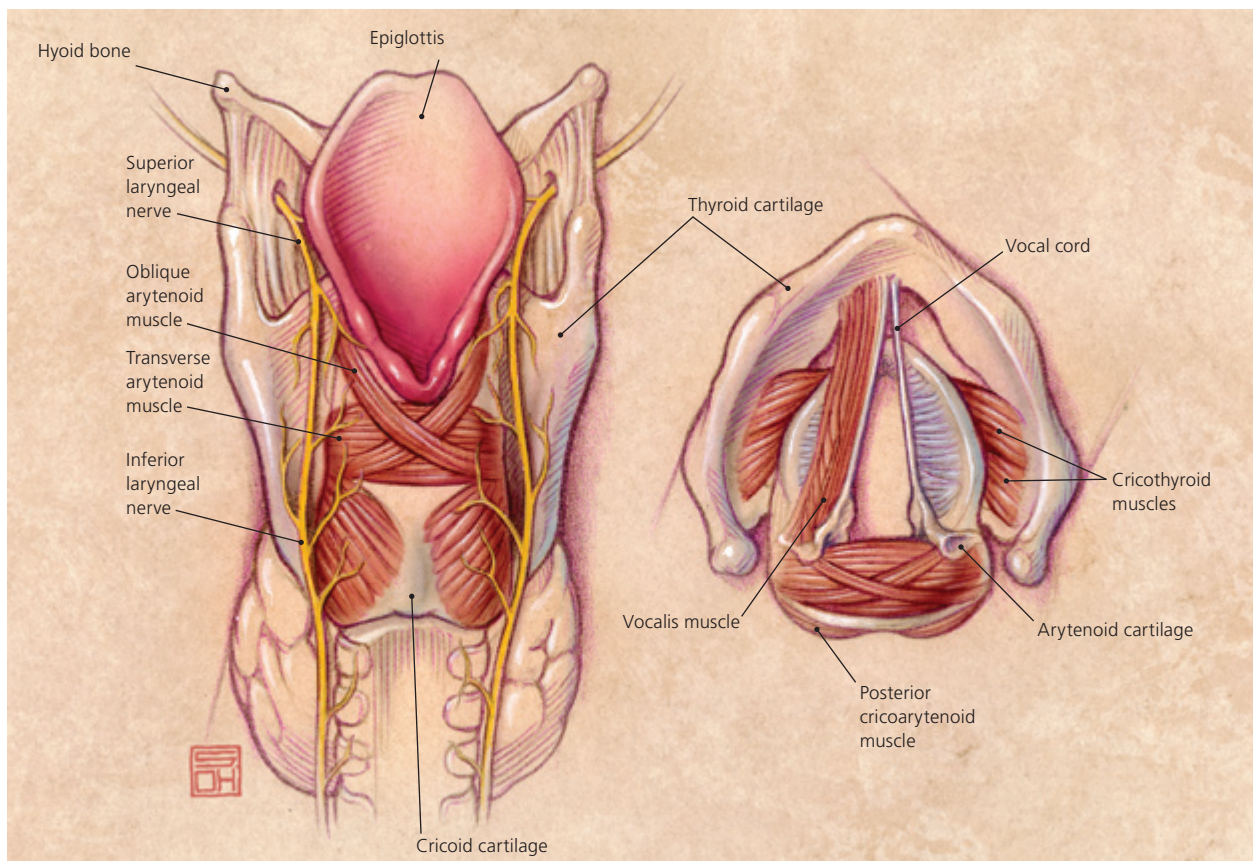


ILLUSTRATION BY STEVE OH

Figure 1. Laryngeal anatomy. (Left) Posterior view of larynx, and (right) cross-section of larynx from above.

Table 1. Common or Important Causes of Hoarseness**Inflammatory or irritant**

Allergies and irritants (e.g., alcohol, tobacco)
 Direct trauma (intubation)
 Environmental irritants
 Infections (upper respiratory infection, including viral laryngitis)
 Inhaled corticosteroids
 Laryngopharyngeal reflux
 Vocal abuse

Neoplastic

Dysplasia
 Laryngeal papillomatosis
 Squamous cell carcinoma

Neuromuscular and psychiatric

Multiple sclerosis
 Muscle tension dysphonia
 Myasthenia gravis
 Nerve injury (vagus or recurrent laryngeal nerve)
 Parkinson disease
 Psychogenic (including conversion aphonia)
 Spasmodic dysphonia (laryngeal dystonia)

Associated systemic diseases

Acromegaly
 Amyloidosis
 Hypothyroidism
 Inflammatory arthritis (cricoarytenoid joint involvement)
 Sarcoidosis

symptoms of rhinitis and sinusitis. Laryngitis is also associated with laryngopharyngeal reflux; however, diagnostic criteria and appropriate medical management for this entity are controversial.²⁻⁴

Chronic laryngitis, which is often associated with a variety of vocal cord lesions, may rarely be irreversible. Smoking and chronic voice abuse are the most common causes of chronic laryngitis. Other irritants, such as laryngopharyngeal reflux, allergies, and inhaled corticosteroid use (especially fluticasone [Flovent]),⁵⁻⁷ may also cause chronic laryngitis.

NEUROMUSCULAR AND PSYCHOGENIC

Vocal cord paralysis can be unilateral or bilateral. Most cases of unilateral vocal cord paralysis are caused by injury to the recurrent laryngeal nerve, which may occur as a result of thyroid, neck, or cardiothoracic surgery,⁸⁻¹⁰ and with mediastinal or apical involvement from lung cancer. Bilateral vocal cord paralysis is most commonly caused by bilateral thyroid surgery. In addition to causing hoarseness as a result of direct trauma to and inflammation of the vocal cords,

Table 2. Laryngoscopic Findings Associated with Causes of Hoarseness

<i>Laryngoscopic findings</i>	<i>Etiologies</i>
Cysts	Vocal abuse
Exophytic or ulcerated lesions	Carcinoma
Granulomas	Direct trauma (intubation), inhaled corticosteroids, laryngopharyngeal reflux, vocal abuse
Laryngeal inflammation	Allergy, direct trauma (intubation), infection, inhaled corticosteroids, laryngopharyngeal reflux, tobacco and other irritants
Leukoplakia (white, thickened patch of epithelium)	Benign leukoplakia, carcinoma, dysplasia
Loss of vocal cord adduction during phonation, but normal adduction with coughing or throat clearing	Conversion aphonia
Nodules	Vocal abuse
Papillomas	Laryngeal papillomatosis (human papillomavirus infection)
Polyps	Allergy, tobacco and other irritants, vocal abuse
Reinke edema (swelling of the superficial lamina propria of the vocal cords)	Laryngopharyngeal reflux, tobacco and other irritants, vocal abuse
Translucent, yellow, waxy deposits on vocal cords	Laryngeal amyloidosis
Ulceration and laceration	Direct trauma (intubation)
Vocal cord in paramedian or lateralized position	Vagus or recurrent laryngeal nerve injury

endotracheal intubation can also cause vocal cord paralysis.¹¹

Muscle tension dystonia caused by excessive laryngeal or extralaryngeal tension is associated with a variety of factors, including poor breath control, hard glottal closures, laryngopharyngeal reflux, and stress.¹² Spasmodic dysphonia, also known as laryngeal dystonia, is a distinct neuromuscular disorder of unknown etiology that results in uncontrolled contraction of the laryngeal muscles and causes focal laryngeal spasm.¹³ Psychogenic voice disorders generally occur as a reaction to stress or as a manifestation of other psychiatric disorders, including malingering. In conversion aphonia, the whispered voice typically remains, but the spoken voice is lost, often following a traumatic event.¹⁴

Hoarseness may also be a manifestation of several degenerative neurologic conditions,

including Parkinson disease, myasthenia gravis, and multiple sclerosis, but it is rarely the sole presenting symptom.

ASSOCIATED SYSTEMIC AND NEOPLASTIC DISEASES

Hoarseness may occur with several endocrine disorders, most notably hypothyroidism and acromegaly. Inflammatory arthritis, such as rheumatoid disease, may affect the larynx and result in hoarseness. Sarcoidosis and amyloidosis are also uncommon causes of hoarseness. Laryngeal amyloidosis may be localized, or may be one manifestation of systemic disease.¹⁵

Laryngeal papillomatosis can occur in adults, as well as in infants and children, because of human papillomavirus infection.¹⁶ Laryngeal leukoplakia may be benign, precancerous, or frankly malignant. Dysplasia (which may be associated with leukoplakia) and squamous cell carcinoma are closely associated with smoking, alcohol consumption, and gastroesophageal reflux.^{17,18} Hoarseness is often the first manifestation of squamous cell carcinoma of the larynx, but associated cough, hemoptysis, laryngeal pain, or dysphagia may also be present.

An Approach to the Patient with Hoarseness

HISTORY

The evaluation of a patient with hoarseness starts with a careful history. The patient's perception of hoarseness as a change in voice quality may be entirely different from the physician's understanding of the symptom. Ask the patient to describe the change in voice quality as specifically as possible, because vocal quality may suggest specific etiologies (*Table 3*). Ascertain the onset, duration, and timing of the voice changes, as well as whether vocal fluctuation and voice fatigue are present. Acute problems are more likely to be related to vocal abuse, infectious or inflammatory causes, or acute injury.

Ask patients about their pattern of voice use and the vocal demand within their occupational and environmental settings, potential triggering factors (e.g., vocal abuse, URI, exposure to allergens or toxins), use of

Table 3. Clinical Clues Suggesting Specific Causes of Hoarseness—Vocal Quality

<i>Vocal quality</i>	<i>Suggested diagnoses</i>
Breathy	Inflammatory arthritis, spasmodic or functional dysphonia, vocal cord mass, vocal cord paralysis
Halting, strangled	Spasmodic dysphonia
Hoarse, husky, muffled, or nasal-sounding	Parkinson disease
Hoarseness worse early in the day	Laryngopharyngeal reflux
Hoarseness worse later in the day	Myasthenia gravis, vocal abuse
Honking	Sarcoidosis
Low pitched	Hypothyroidism, laryngopharyngeal reflux, leukoplakia, muscle tension dysphonia, Reinke edema, vocal cord edema, vocal cord paralysis
Raspy or harsh	Laryngopharyngeal reflux, muscle tension dysphonia, vocal cord lesion
Scanning speech and dysarthria	Multiple sclerosis
Soft (loss of volume)	Vocal cord paralysis, Parkinson disease
Spoken voice lost, but whispered voice maintained	Conversion aphonia
Strained, effortful phonation	Muscle tension dysphonia
Strained	Laryngopharyngeal reflux, muscle tension dysphonia, spasmodic dysphonia
Thick, deep voice and slowed speech	Acromegaly
Vocal fatigue	Muscle tension dysphonia, myasthenia gravis, Parkinson disease, vocal abuse

Table 4. Clinical Clues Suggesting Specific Causes of Hoarseness—History and Physical Examination

<i>History and physical examination findings</i>	<i>Suggested diagnoses</i>
Cough	Allergy, tobacco and other inhaled irritants, URI
Dysphagia	Carcinoma, inflammatory arthritis, laryngopharyngeal reflux
Heart burn	Carcinoma, laryngopharyngeal reflux
Hemoptysis	Carcinoma
History of heavy alcohol use	Carcinoma, laryngopharyngeal reflux
History of smoking or tobacco use	Carcinoma, chronic laryngitis, leukoplakia, Reinke edema
Odynophagia	Carcinoma, inflammatory arthritis, URI
Palpable lymph nodes	Carcinoma, URI
Professional voice user or untrained singer	Vocal abuse
Recent head, neck, or chest surgery	Vagus or recurrent laryngeal nerve injury
Recent intubation or laryngeal procedure	Direct trauma
Rhinorrhea, sneezing, watering eyes	Allergy, URI
Sensitivity to heat, spicy foods, other irritants	Leukoplakia
Stridor, symptoms of airway obstruction	Carcinoma, laryngeal papillomatosis
Throat clearing	Allergy, inhaled corticosteroids, laryngopharyngeal reflux
Weight loss	Carcinoma
Wheezing, other signs of asthma	Allergy, inhaled corticosteroids

URI = upper respiratory infection.

alcohol and tobacco (including secondhand smoke exposure), and associated symptoms (Table 4).

PHYSICAL EXAMINATION

The examination should begin with an assessment of the patient's vocal quality, which as noted previously, may suggest specific causes. This should be followed by a careful general physical examination with particular attention to the head and neck. Findings that point to specific causes of hoarseness are noted in Table 4.

LARYNGOSCOPY AND OTHER STUDIES

When the onset of hoarseness is acute, lasting less than two weeks, with an apparent benign cause (e.g., recent vocal abuse, URI, allergy, gastroesophageal reflux symptoms), and there is nothing to suggest a more serious etiology, empiric treatment may be instituted without further evaluation. In patients with recent symptoms of gastroesophageal reflux, it is an option to treat with short courses of high-dose proton pump inhibitors to see if hoarseness improves.

When hoarseness lasts longer than two weeks and does not have an apparent benign cause, direct evaluation of the larynx by direct or indirect laryngoscopy is indicated

in most cases.^{19,20} In patients taking inhaled corticosteroids, it is an option to alter the regimen of their inhaled medication to see if the hoarseness improves. Also, in patients with poorly controlled conditions that are known to cause hoarseness (e.g., hypothyroidism), it is an option to optimize treatment of the associated condition before proceeding with laryngoscopy. In both cases, reliable follow-up of patients must be assured.

Regardless of the duration of the hoarseness, if it does not resolve promptly with appropriate intervention, complete evaluation with laryngoscopy is indicated. In patients with risk factors or other symptoms or signs of laryngeal cancer, prompt evaluation with laryngoscopy should be undertaken. Figure 2 provides an empiric approach to the patient with hoarseness.

Family physicians trained in direct or indirect laryngoscopy can perform these procedures in the office setting; otherwise, referral is essential. When simple vocal cord pathology is found, appropriate treatment can usually be instituted. If the etiology of the hoarseness cannot be established from laryngoscopic examination, or biopsy of a suspicious lesion is indicated, referral to an otolaryngologist should be made. In some cases, radiographic studies, videostroboscopy, or evaluation by a

Initial Assessment and Management of Hoarseness

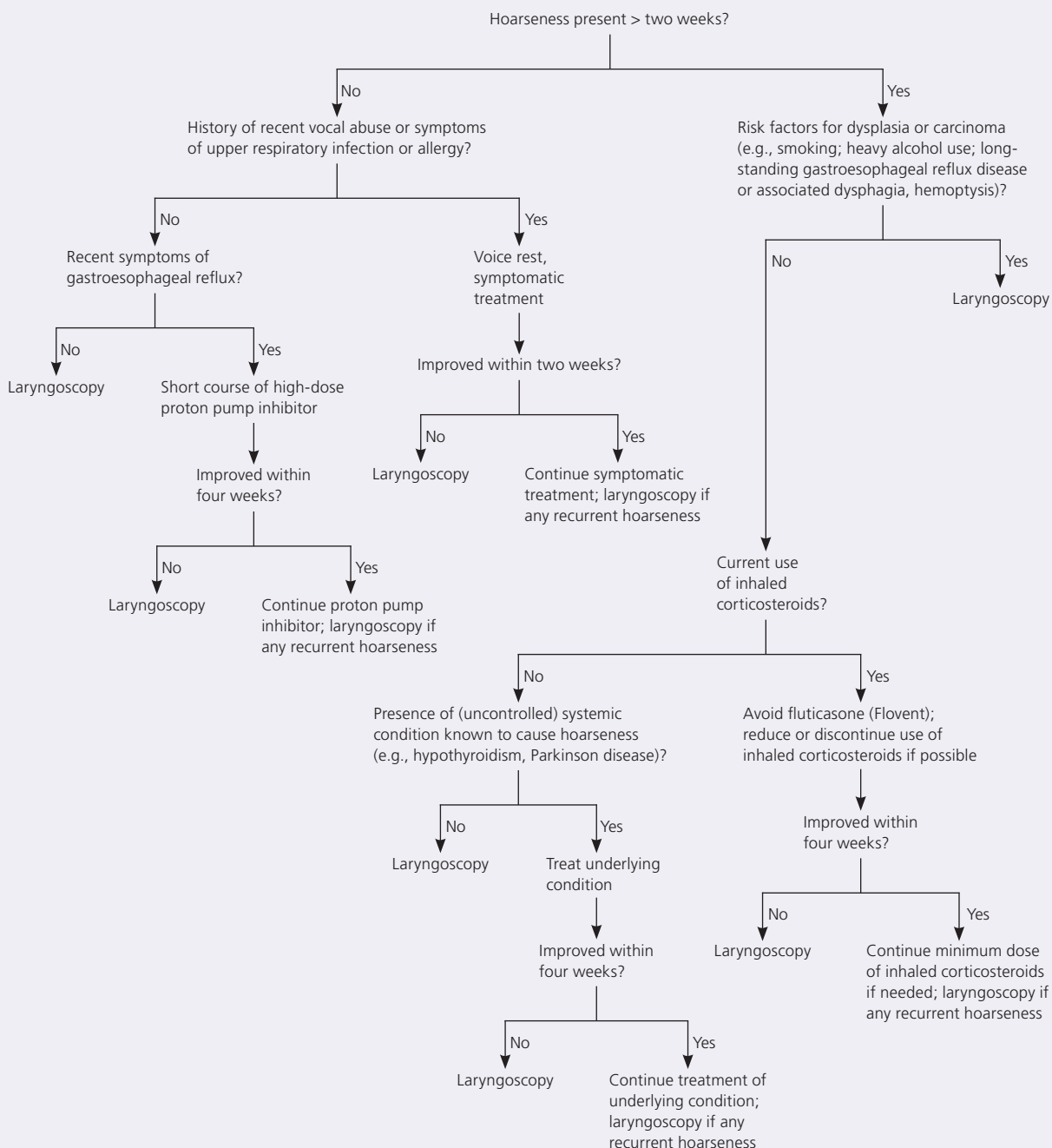


Figure 2. Algorithm for initial assessment and management of hoarseness.

speech-language pathologist may be helpful in establishing a diagnosis.

Treatment of Hoarseness

The treatment of hoarseness includes identification and treatment of any underlying conditions, vocal hygiene, voice therapy, and specific treatment of vocal cord lesions.

When a treatable underlying cause, such as allergies or hypothyroidism, is identified, treatment of that condition may relieve the hoarseness. Patients requiring inhaled corticosteroids should use the lowest dose and avoid fluticasone when possible.⁵ Although the use of proton pump inhibitors has been widely promoted for the treatment of

laryngeal symptoms presumed to be caused by laryngopharyngeal reflux, a Cochrane review found that evidence of their effectiveness is lacking.²¹ Recent reviews of the subject suggest that, when used for this purpose, proton pump inhibitors should be prescribed in relatively high doses; if the hoarseness or other laryngeal symptoms have not resolved after three or four months, the physician should question the diagnosis and search for other etiologies.²⁻⁴ This also assumes that patients have previously undergone laryngoscopy during evaluation.

VOCAL HYGIENE

There is some evidence that vocal hygiene education may be effective in the management of hoarseness.^{22,23} The vocal hygiene programs evaluated included education in environmental changes (e.g., humidification of the air; avoidance of smoke, dust, and other inhaled irritants); behavior changes (e.g., avoidance of frequent coughing or throat clearing); vocal habit changes (e.g., avoidance of shouting or speaking loudly for prolonged periods); and dietary changes (e.g., increased fluid intake; avoidance of large meals, excessive caffeine and alcohol use, and spicy foods). Although the overall education programs were shown to be beneficial, the value of any of the specific components (e.g., individual dietary recommendations or behavior changes) has not been demonstrated.

VOICE THERAPY

Voice therapy, or voice training, refers to a variety of nonsurgical techniques used to improve or modify the voice quality. The goal of voice therapy is to modify vocal behaviors to reduce laryngeal trauma. Typically it involves vocal and physical exercises coupled with behavior changes, including vocal hygiene, voice rest, muscle relaxation, and respiratory support. Voice therapy sessions usually last 30 to 60 minutes weekly, for a total of eight to 10 weeks. The success of voice therapy depends largely on the active participation of the patient in therapy sessions, adherence to vocal hygiene, and practice of the training exercises.

Voice therapy is an effective method for improving voice quality and vocal performance in patients with nonorganic dysphonia²⁴ and for treating many benign pathologic vocal cord findings, such as nodules, polyps, cysts, and granulomas.²⁵⁻²⁷ Referral to a speech-language pathologist for voice therapy may be particularly helpful for patients whose occupation depends on singing or talking loudly or for prolonged periods.

Referral for surgical or other targeted interventions is indicated whenever conservative management of vocal cord pathology is unsuccessful, when dysplasia or carcinoma is suspected, or when significant airway obstruction is present.

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