



VOICE DISORDERS

# LARYNGITIS

# Laryngitis: Highlights

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**Body part + "-itis"** means inflammation of that part

**Laryngitis = larynx + itis** = inflammation of the larynx

## Inflammation: Body Response to Injury

- Inflammation is the body's way of healing itself in response to injury from any of a number of causes.
- Inflammation is usually characterized by swelling of the injured site (**edema**), redness (**erythema**), and pain in the area.
- Usually, once the cause of the injury is removed, the inflammation subsides when healing of the injured area is complete. However, repeated injury that causes chronic inflammation can result in other types of injury and injury response, preventing complete healing.

## Laryngitis: General Term Meaning Inflammation of the Larynx

Laryngitis, or inflammation of the larynx, can have many causes. As such, a correct diagnosis of laryngitis should always indicate the cause. For example:

- **Viral laryngitis:** Inflammation from a viral infection
- **Reflux laryngitis:** Inflammation from backflow of stomach fluids (reflux) to the throat and voice box

## Acute and Chronic Laryngitis

- Laryngitis that is short lived is classified as **acute laryngitis**.
- Laryngitis that lasts longer than two to four weeks is classified as **chronic laryngitis**.

## Location of Inflammation Depends on Cause

The location of inflammation in the **larynx** usually depends on the area injured by exposure to an irritant or injuring agent.

- For example: If the larynx is exposed to smoke, allergens, or environmental pollutants, then the laryngitis will involve the entire larynx. If laryngitis is due to backflow of stomach fluids (**laryngopharyngeal reflux**), then inflammation may be present only in the back side of the larynx.

# Understanding Laryngitis

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## What is laryngitis?

### Inflammation of the Larynx

- Laryngitis is diffuse (widespread) or local inflammation of the voice box (**larynx**) in response to chronic or acute irritation caused by mechanical, chemical, allergic, or infectious agents.
- This irritation usually results in redness (**erythema**) and swelling (**edema**) of any part of the larynx, and is commonly labeled laryngitis.
- Usually, the laryngitis (redness and swelling) will resolve when the irritants are removed from contact with the larynx.

## Two Main Types of Laryngitis

### Type Determined by How Long Inflammation Lasts

- **Acute laryngitis:** Short-lived inflammation of the larynx
- **Chronic laryngitis:** Prolonged inflammation of the larynx

### Acute Laryngitis

- If the contact with the irritant is sudden and short-lived, the laryngitis will occur abruptly and will improve when the irritant is removed.
- Common causes of acute laryngitis include:
  - Upper respiratory tract infection from bacteria, viruses, and some fungi or molds
- Other, less common, causes of acute laryngitis include:
  - Exposure to highly concentrated air pollutants (such as spray paints, oven cleaners, or other solvents)
  - Smoke inhalation during a closed-space fire
  - Deliberate inhalation of heated fumes (such as with smoking crack cocaine)
  - Blunt or penetrating trauma to the larynx

### Chronic Laryngitis

- When the exposure to the irritant is prolonged, the laryngitis will remain as long as the irritant is present
- Common causes of chronic laryngitis include:
  - Laryngopharyngeal **reflux**
  - Allergies
  - Tobacco smoking (cigarettes or cigars)
  - Marijuana use
  - Use of inhaled steroids or other oral inhalers
  - Some fungal and bacterial infections
  - Voice misuse or abuse
  - Chronic cough

Laryngitis results when the larynx is exposed to an irritant. Some irritants can cause both acute and chronic laryngitis;

other irritants cause only one type of laryngitis.

Common Causes of Laryngitis	Type of Laryngitis	
	Acute (short-lived)	Chronic (longer term)
<b>Infectious</b>		
Bacterial	X	
Viral	X	
Fungal	X	X
<b>Contact</b>		
Reflux	X	X
Pollutants	X	X
Smoking		X
Inhaled Medications		X
Caustic Ingestions	X	X
<b>Medical</b>		
Vocal Misuse	X	X
Vocal Abuse		X
Trauma	X	X
<b>Allergic</b>		
Allergies	X	X
<b>Dryness (Laryngitis Sicca)</b>		
Dehydration	X	X
Dry Atmosphere	X	X
Mouth Breathing	X	X
Medications	X	X
<b>Thermal</b>		
Closed-Space Fire	X	X
Crack Pipe	X	X

# Symptoms of Laryngitis

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## What are the symptoms of laryngitis?

### Hoarseness: The Most Common Patient Complaint

The most common symptom of laryngitis is hoarseness. Hoarseness is usually a raspy or husky sound of the voice resulting from swelling within the vocal fold. Swelling limits the normal vibratory movement of the vocal fold during phonation, which causes the sound produced to be less harmonic and raspier. *(For more information, see Anatomy & Physiology of Voice Production.)*

### Swelling Causes the Typical "Low Voice"

In some cases, swelling may limit the ability of the vocal folds to vibrate at higher speeds (**frequencies**), which are needed to produce high-pitched sounds. This causes a decrease in the pitch range and affects high notes more severely, thus resulting in a "low voice."

### Severe Swelling Causes Loss of Voice

If there is significant swelling of the vocal folds, they may not be able to vibrate at all, and no sound or only a whisper is produced.

### Other Symptoms

Other symptoms of laryngitis include:

- Sore throat
- Dry throat
- Itchy throat
- Sensation of something stuck in the throat
- Difficulty breathing (rare)

These symptoms are not always present when laryngitis occurs. They may also occur as symptoms of problems other than laryngitis.

## How do I know if I have laryngitis?

### First Sign: Hoarseness

The development of hoarseness is usually the first sign of laryngitis. However, hoarseness can be a sign of other voice problems as well. *(For more information, see Overview of Diagnosis, Treatment & Prevention.)*

### Avoid Voice Exertion When Laryngitis Is Present

The voice should not be used excessively during laryngitis in the absence of evaluation by an ear-nose-throat (ENT) specialist (**otolaryngologist**). In some cases of laryngitis, excessive voice use can cause further and irrevocable injury to the vocal folds, leading to vocal fold hemorrhage, vocal fold scar, and/or vocal fold lesions. Examples of excessive voice use include singing, acting, performing, lecturing, or excessive talking or phone use.

### Hoarseness Longer Than 14 Days Must Be Evaluated

Hoarseness persisting longer than 14 days should be evaluated by an ear, nose, and throat specialist (otolaryngologist) or ENT voice specialist (**laryngologist**).

## Red Flag

### **Vocal Fold Bleeding Is a Voice Emergency**

The sudden onset of hoarseness over the course of minutes to 24 hours after strenuous vocal use (such as singing, acting, yelling, screaming, coughing, vomiting) may indicate vocal fold bleeding (**hemorrhage**), which is an emergency requiring immediate examination by a laryngologist or otolaryngologist.

# Diagnosis of Laryngitis

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## How is laryngitis diagnosed?

### Viewing the Voice Box Is Important

Laryngitis is diagnosed by examination of the larynx. The laryngeal examination may include a mirror examination or specialized magnified viewing of the voice box ([rigid laryngoscopy](#) or [laryngeal stroboscopy](#)). (*For more information, see [Laryngoscopy/Stroboscopy](#).*)

The following are investigated during laryngoscopy:

- Area with inflammation
- Clues to possible cause(s) of laryngitis
- Other voice box lesions or problems already present in addition to laryngitis

### Assessing Vocal Fold Vibration With Stroboscopy

- Stroboscopy is a procedure that enables an assessment of the vibratory function of the vocal folds. Alterations in vocal fold vibration may result from the swelling or from vocal fold lesions that may be present. (*For more information, see [Laryngoscopy/Stroboscopy](#).*)
- Often, laryngitis can make symptoms quite noticeable; for instance, a patient with laryngitis may be prompted to seek medical care for a vocal fold lesion that was already present (but not noticed).

### Typical Appearance of Voice Box

On laryngeal examination, laryngitis appears as redness and/or swelling of the larynx. This swelling may occur throughout the larynx (diffuse) or may occur only on the vocal folds or in the back of the larynx. Typical patterns of laryngitis are:

- **Diffuse (widespread) swelling:** Usually the result of an inhaled cause of laryngitis, such as smoke or an air pollutant.
- **Swelling limited to vocal folds:** Usually occurs due to mechanical causes of laryngitis, such as vocal misuse or overuse.
- **Swelling in the back of the voice box (larynx):** Also known as [posterior laryngitis](#), occurs most commonly with backflow of stomach fluids to the throat and voice box area ([laryngopharyngeal reflux \(LPR\)](#)).

### Investigating Possible Cause(s) of Laryngitis

General guidelines:

- More than one factor may cause laryngitis.
- Laryngitis is a general term describing an area of inflammation; the cause of the laryngitis needs to be identified before a complete medical diagnosis can be offered.
- The identification of the cause of laryngitis and other associated problems is required to determine optimal therapy and to maximize healing results.

### Role of Allergies in Voice Disorders

- The exact role of allergies in patients with voice disorders is highly controversial.
- Some otolaryngologists with a very strong orientation to and interest in allergic disease believe that the majority of voice problems are caused by either environmental or food allergies.

- However, environmental allergies are extremely common, such that any patient with a voice problem may also have mild to moderate environmental allergies.
- A direct connection of a voice problem to a coexisting allergy problem has not been strongly and convincingly made in a majority of patients with voice problems. Patients with voice problems should be examined carefully with high-quality laryngeal examination, review of the patient's symptoms, and allergy evaluation if indicated.

## Role of Laryngopharyngeal Reflux in Laryngitis

- The role of **laryngopharyngeal reflux disease (LPR)** in laryngitis specifically and in voice disorders in general is highly controversial.
- Many otolaryngologists and laryngologists believe that a high degree of a patient's primary voice disorder comes from unsuspected and subtle laryngitis due to gastric acid reflux. However, other otolaryngologists and laryngologists believe that LPR is not as prevalent in the field of voice disorders.
- One reason for this controversy is the difficulty in making a definitive diagnosis of LPR. *(For more information, see Reflux Laryngitis.)*

### Red Flag

**"Chronic Laryngitis" Is a Vague Term – *specific cause needs to be identified to arrive at diagnosis and determine appropriate treatment***

Chronic laryngitis, without identification of a cause, is not a specific diagnosis. A patient diagnosed with chronic laryngitis should ask the otolaryngologist to identify the underlying cause of the chronic laryngitis.

Most otolaryngologists avoid the term "chronic laryngitis" since it has no specific meaning and thus does not provide helpful information to the patient or other physicians.

# Treatment of Laryngitis

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## How is laryngitis treated?

Treating laryngitis involves treating the underlying cause and/or removing the irritant from the environment. *(For more information, see Understanding the Disorder.)*

### General Guidelines

- **Hydration** is an important component of laryngitis treatment. In most cases of laryngitis, either the mucous secretions are excessively thick or the lubrication of the larynx is decreased.
  - Drinking water helps to maintain the thin character of the mucosal lubrication.
  - Steam or mist humidifiers can help to lubricate the vocal folds.
  - Avoiding exposure to drying agents such as caffeine or dehydrating medications can also help to preserve the lubrication of the larynx. *(For more information, see Laryngitis Sicca.)*
- **Limiting voice use** allows the vocal fold tissue to heal without the added trauma and stress caused by trying to phonate with swollen vocal folds. Voice rest can help to accelerate the healing process.
- **Surgery** is rarely indicated for laryngitis.

### Key Information

#### Multifactorial Voice Disorders

In some cases, the laryngitis masks or leads to an incomplete diagnosis. Thus, despite appropriate treatment for laryngitis, some patients fail to improve due to the failure to recognize other laryngeal problems. Common problems that can be missed when laryngitis is present include vocal fold paresis, muscle tension dysphonia, and functional dysphonia.

#### Need for Identification of Cause for Proper Treatment

When the primary cause of the laryngitis is not directly treated, and only the inflammation and the irritation of the larynx are addressed with anti-inflammatory medications such as steroids, the laryngitis will continue. A definitive cause for the laryngitis must be determined after careful review of the patient's history, symptoms, and laryngeal examination to ensure proper treatment.

## A Perspective on Anti-inflammatory Medication

The optimal treatment for laryngitis should first involve the identification and subsequent removal or minimization of the irritating source of the laryngitis. Then, and only then, should the inflammation and irritation of the larynx be treated. In other words, patients should generally not be treated with steroids without a specific identified cause for the laryngitis.

### Red Flag

#### Use of Steroids Controversial

Use of inhaled steroids for laryngitis is highly controversial. According to current best practices, use of inhaled steroids for the treatment of laryngeal irritation and inflammation is rare.

Inhaled steroids are designed to treat asthma and other pulmonary conditions; in fact, most patients who have asthma describe throat irritation from the inhaled steroid medication itself or the associated propellant of the medication.

Patients should consult with their physician as to possible complications of steroid medication.

## What will happen if laryngitis is left untreated?

If left untreated, laryngitis is thought by some physicians to lead to the development of hyperfunctional voice disorders such as muscle tension **dysphonia**, which may contribute to the formation of nodules, polyps, cysts, scarring, hyperkeratosis, and Reinke's edema. *(For more information, see Vocal Fold Scarring, Reinke's Edema, and Vocal Fold Nodules, Polyps, Cysts, and Reactive Lesions.)*

# Types of Acute Laryngitis

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## In This Section

This section contains information on the following six categories of laryngitis:

1. Infectious laryngitis
  - Bacterial
  - Viral
  - Fungal
2. Contact laryngitis
  - Inhaled pollutants
  - Tobacco smoke and other kinds of smoke
  - Inhaled medications
  - Inhaled caustic compounds
3. Mechanical laryngitis
  - Vocal abuse and misuse
  - Laryngeal trauma
4. Allergic laryngitis
5. Laryngitis *sicca*
6. Thermal laryngitis

## Infectious Laryngitis

### What is infectious laryngitis?

When the larynx is infected with bacteria, viruses, or fungi/molds, an acute laryngitis may result. The laryngitis is a direct response of the larynx to the presence of these foreign organisms. The redness and swelling occur as the body's way of trying to rid the larynx of the infectious materials.

## Bacterial Laryngitis

### What is bacterial laryngitis?

Bacterial laryngitis occurs as a result of bacterial infection of the larynx.

### What causes bacterial laryngitis?

The bacteria that cause the infection are usually inhaled through the air from another person who carries the organisms (usually someone who is either sick with or recovering from an upper respiratory tract infection).

### What are the symptoms of bacterial laryngitis?

The infection usually begins with the following symptoms:

- Sore throat
- Fever

- Painful swallowing
- Cough
- Hoarseness

Other symptoms of upper respiratory tract infection may be present as well. Common symptoms of upper respiratory tract infections include:

- Cough
- Fever
- Nasal drainage
- Nasal congestion
- Facial pressure
- Facial pain
- Sore throat
- Hoarseness
- Headache
- Earache
- Ear fullness
- Ear popping
- Swollen glands in the neck

In rare instances, the inflammation can progress to make breathing difficult. Difficulty breathing can be accompanied by noisy breathing (**stridor**), which can occur on breathing in, on breathing out, or in both phases of breathing.

#### **Red Flag**

- Noisy breathing (stridor) is a sign of obstruction or narrowing of the laryngeal or tracheal parts of the airway.
- Stridor is a sign of difficulty passing air, and its presence represents a medical emergency.
- A person with stridor should be evaluated immediately by a physician skilled in airway management, such as an otolaryngologist, an emergency department physician, or a general surgeon.

### **How is bacterial laryngitis diagnosed?**

Examination of the larynx usually reveals redness and swelling throughout the larynx. The **epiglottis** in particular may be involved more than in other forms of laryngitis; it will have a bright red color and swelling that may be severe enough to limit the passage of air through the larynx. There may be signs of pus in the larynx, which "nails down the diagnosis" for bacterial infection – however, the absence of pus is a more common finding.

### **How is bacterial laryngitis treated?**

- Treatment of acute bacterial laryngitis usually involves the use of antibiotics, either by mouth or given intravenously. Intravenous antibiotics are generally given when the infection is severe enough to cause difficulty breathing (stridor). Bacterial laryngitis tends to resolve itself with adequate treatment with antibiotics.
- The inhalation of humidified air helps to soothe the irritation and to keep the larynx moist and lubricated.
- Steroids are sometimes administered when severe swelling of the larynx results in partial airway obstruction and breathing difficulty.
- In rare cases, the swelling may be so severe that imminent airway obstruction is possible, which may result in the inability to breathe. In such cases, a tube may be placed either through the neck (tracheotomy) or through the larynx (endotracheal

intubation) to bypass the obstruction and allow sufficient passage of air into the lungs.

## Viral Laryngitis

### What is viral laryngitis?

Viral laryngitis is caused by a viral infection of the larynx.

### What causes viral laryngitis?

Viruses usually are contracted by inhaling respiratory droplets released into the air by people who are "carrying" the virus.

### What are the symptoms of viral laryngitis?

Viral laryngitis usually is characterized by:

- General fatigue
- Malaise
- Low-grade fever
- General body aches
- Cough
- Hoarseness
- Sore throat
- Dry throat

Other symptoms of upper respiratory tract infection may also be present, depending on the sites involved with the infection.

### How is viral laryngitis diagnosed?

Usually, mild redness and swelling are present throughout all structures of the larynx, without predilection for any one structure in particular.

- **In adults:** Viral laryngitis usually does not cause airway obstruction in adults.
- **In children:** Children with viral-induced obstruction of the subglottic larynx may have difficulty breathing, characterized by noisy breathing (stridor) and/or a cough that sounds like a small dog barking – often referred to as a "croupy cough."
- **In infants:** Because an infant's larynx has a very small diameter, infants are more prone to breathing difficulty with viral infections than are adults. Typically, the subglottic larynx (the part of the larynx below the vocal folds, also the narrowest part of the larynx in infants) is the part of the larynx that may become sufficiently inflamed to cause airway obstruction.

## Fungal Laryngitis

### What is fungal laryngitis?

Fungal laryngitis is inflammation of the larynx caused by the growth of disease-causing fungal organisms. Fungal organisms cause molds. The most common cause of fungal laryngitis is *Candida Albicans*, the fungus that causes thrush. Other fungi/molds that may also cause laryngitis include *Histoplasma*, *Blastomyces*, *Aspergillus*, and other less common organisms.

#### Key Information

*Histoplasmosis* and *Blastomycosis* are more common in areas of North America in which these organisms are endemic. *Blastomyces* is endemic in the southwestern United States, and *Histoplasma* is endemic in the Midwestern United States. *Aspergillus* and *Candida* species are found throughout North America.

## How does someone acquire fungal laryngitis?

**Immune compromised patients are prone to fungal infections:** Fungal laryngitis usually occurs in patients whose natural defense mechanisms against infection are compromised. When the body's immune system is suppressed, certain fungi that usually do not cause infection may penetrate the natural blood and tissue barriers and cause infection of the larynx and other parts of the upper respiratory tract. When this occurs, inflammation occurs in the form of laryngitis.

- People who use steroid inhalers, take steroids systemically (i.e., either ingest them by mouth or take them intravenously), or are on immunosuppressant medications (e.g., to prevent rejection of transplanted organs or treat severe arthritis) are prone to fungal infections. Steroids and other immunosuppressants are anti-inflammatory medications that suppress the body's natural response to injury (including infection, laceration, ulceration, and trauma). As such, they also suppress the body's natural ability to protect itself against infection by fungal organisms.
- Certain disease states decrease the body's ability to fight infection. The most common of these diseases are: disorders of the blood (such as leukemia and lymphoma), infection with HIV, chronic kidney disease, and chronic liver disease.

## What are symptoms of fungal laryngitis?

Fungal infections are usually slow paced; therefore, symptoms of fungal laryngitis are typically of gradual onset – coming on slowly rather than suddenly.

Fungal laryngitis may have one or more of the following symptoms:

- Sore throat
- Difficulty swallowing
- Hoarseness
- Cough
- Ear pain
- Scratching or itching sensation in the throat
- Dry throat

If these symptoms occur in a person who is immunocompromised by any mechanism (including the use of inhaled steroids to treat asthma), fungal laryngitis needs to be investigated.

## How is fungal laryngitis diagnosed?

Fungal laryngitis is usually diagnosed visually, because typical-looking fungal lesions are visible in the voice box (larynx), mouth cavity, and/or throat. Depending on the fungal organism involved, different parts of the larynx may be involved more than others.

Some specific case scenarios:

- Candida typically involves the entire larynx, but may be more prominent on the vocal folds. Candidal infection usually causes the formation of a white plaque, often called a pseudomembrane, which does not scrape off easily.
- Histoplasma and Blastomycoses often cause a more severe inflammatory reaction called a granulomatous reaction.

### Key Information

A note on **granulomatous reaction**. A granulomatous reaction is an infiltration into affected tissue of specialized blood cells called macrophages, which are specifically designed to engulf foreign material and fight infection. This reaction produces a characteristic appearance under the microscope commonly described as "granulomas" or "multi-nucleated granulomas." These are not to be confused with the "granulomas" that form on the vocal process of the arytenoids in response to trauma and reflux; these, in actuality, are not true granulomas but are chronic inflammatory or granulation tissue.

- Aspergillus infection of the larynx typically produces a diffuse laryngitis characterized by significant redness and occasionally areas of ulceration.

A culture of the infecting organism can confirm the diagnosis and identify the cause of the fungal infection. Cultures also allow testing that will reveal the type of antifungal agent that will most effectively fight the infection. Cultures can be taken by swabbing plaques or areas of ulceration or by biopsy of the affected tissue.

### Key Information

#### **A Note on Biopsy**

Biopsy of the vocal folds for the purpose of obtaining culture material is avoided whenever possible to minimize scar formation within the vocal folds. Biopsy is usually performed for granulomatous lesions when carcinoma is suspected. When possible, biopsy is performed in an area of the larynx that is not intimately involved in voice production.

## **How is fungal laryngitis treated?**

Treatment of fungal laryngitis usually involves the use of an anti-fungal medication such as:

- Nystatin
- Fluconazole
- Ketoconazole
- Itraconazole
- Other anti-fungal drugs

Medication selection depends on the organism involved and its sensitivity to the available medications. Drug sensitivity is determined by testing the fungus grown from the culture taken from the lesions.

Patients should consult their physician regarding medication. Patients should also discuss with their physician the possible side effects from medications.

## **Contact Laryngitis**

### **What is contact laryngitis?**

Contact laryngitis occurs when the larynx is exposed to chemical irritants.

### **What causes contact laryngitis?**

Reflux of gastric juices from the stomach (laryngopharyngeal or gastroesophageal reflux), inhaled pollutants, tobacco smoke, inhaled medications, or ingested caustic compounds may all cause contact laryngitis. (*For more information, see Reflux Laryngitis.*)

## **Inhaled Pollutants**

### **How do inhaled pollutants cause contact laryngitis?**

Aerosolized pollutants contain various chemical structures that cause laryngitis by irritating the laryngeal mucosa lining when inhaled. These pollutants include substances such as:

- Paints
- Oven cleaners
- Insecticides
- Solvents
- Tar
- Smoke

These substances cause direct mucosal irritation and are hygroscopic (water absorbent), which dries the laryngeal mucosa.

### **What are the symptoms of pollutant-caused contact laryngitis?**

- The irritation and dryness produced by the pollutants causes redness and an itching or scratching sensation in the larynx, which may lead to a cough.
- The absorption of water from the vocal fold mucosa limits the vibratory function of the vocal folds, producing a hoarse voice.
- Coughing and sore throat usually result from the drying effect, as well as from the inflammation that develops.

### **How is pollutant-caused contact laryngitis diagnosed?**

On examination, the larynx will appear diffusely red, with minimal to no initial edema (swelling). The drying effect of the chemical irritants reduces the amount of fluid, hence swelling does not occur.

### **How is pollutant-caused contact laryngitis treated?**

- Treatment involves both removal of the individual from the offending environment and hydration.
- Hydration can be accomplished by drinking water as well as by inhaling the mist from steam or mist humidifiers. Hydration may lead to edema, resulting in a temporary worsening of hoarseness.
- Once the inflammatory response begins to subside, the redness and swelling will decrease as well and the hoarseness will disappear.

## **Tobacco Smoke and Other Kinds of Smoke**

### **How does tobacco smoke cause contact laryngitis?**

Tobacco smoke is a form of inhaled pollutant. In addition to tar, nicotine, and carbon monoxide, tobacco smoke contains numerous other toxic compounds that are irritating to the laryngeal mucosa (lining).

### **What are the symptoms of tobacco smoke-induced contact laryngitis?**

- Upon initial exposure to tobacco smoke (including secondhand smoke), the larynx will be dry and red. Symptoms will include cough, hoarseness, and a dry tickle in the throat.  
  
If exposure to the tobacco smoke is limited and does not recur, the redness and swelling will begin to subside over the course of the next 48 to 72 hours. The voice may remain hoarse until the swelling has resolved.
- With repeated or chronic exposure to tobacco smoke, the larynx does not have time to heal after the swelling begins, leaving the vocal folds and the remainder of the larynx red and swollen from inflammation.  
  
The swelling may be mild or severe and occurs in the key vibrating layer of the vocal folds (the superficial lamina propria, Reinke's space). (*For more information, see Anatomy & Physiology of Voice Production.*)  
  
The voice usually is of lower pitch than normal, more "husky" in sound, rough or raspy, and hoarse as a result of the swelling.  
  
The severity of the symptoms varies with the amount of swelling present.

### **How does smoking other substances cause contact laryngitis?**

Smoking other substances, such as marijuana or crack cocaine, may cause a contact laryngitis in a similar fashion as tobacco smoke. In addition, in some instances crack cocaine may cause a heat-induced laryngitis.

## **Inhaled Medications**

### **How do inhaled medications cause contact laryngitis?**

Orally inhaled medications, such as those used to treat asthma, may cause a contact laryngitis, a fungal laryngitis, or both. When

laryngeal irritation occurs, it is through the same drying mechanism as caused by the inhaled pollutants. Fungal (mold) infections of the larynx can occur with the use of steroid inhalers, as described in the section on fungal laryngitis.

### What medications cause contact laryngitis?

Contact laryngitis from oral inhalers can occur with any of the commonly prescribed inhaled medications, including:

- Albuterol
- Bitolterol
- Levalbuterol
- Salmeterol
- Terbutaline
- Budesonide
- Triamcinolone
- Beclomethasone
- Isoetharine
- Metaproterenol
- Pirbuterol
- Beclomethasone
- Fluticasone
- Nedocromil

Contact laryngitis results from laryngeal sensitivity to the propellant, the preservative, or to the active ingredient of the inhaler. Often patients with contact laryngitis from oral inhalers can be treated with alternative medications (i.e., pills) and/or inhaled medications that do not use propellants (i.e., turbo-inhaler).

### Ingested Caustic Compounds

#### Caustic Agents

Detergents	Acids	Lye and Bases
<ul style="list-style-type: none"> <li>• Contain compounds which easily destroy lining tissue and cause intense swelling</li> <li>• Swelling may be delayed as late as 24 hours after ingestion</li> <li>• May cause breathing difficulty</li> </ul>	<ul style="list-style-type: none"> <li>• Cause permanent injury to tissues that come in contact</li> <li>• May cause swelling of voice box and result in breathing difficulty</li> </ul>	<ul style="list-style-type: none"> <li>• Usually affect the esophagus but can affect the voice box</li> <li>• May cause swelling of voice box and result in breathing difficulty</li> </ul>

#### Red Flag

Any and all airway problems require immediate attention.

### How do ingested caustic compounds cause contact laryngitis?

Ingested caustic compounds such as bleaches, detergents, lye, acids, and bases can cause acute or delayed laryngitis if the ingested substance comes in contact with the larynx.

#### Common Caustic Compounds

Acids	Bases	Other
Hydrochloric acid (HCl)	Drain cleaners	Low phosphate detergents
Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> )	Ammonia (NH <sub>4</sub> OH)	Nonphosphate detergents
Bleach (hypochloric acid or HClO)	Dishwasher soaps	

	No-lye hair relaxers	
	Potassium hydroxide (KOH)	
	Sodium hydroxide (NaOH)	
	Calcium hydroxide (Ca(OH) <sub>2</sub> )	

Such ingestions usually occur accidentally in young children or as suicide attempts in adolescents and adults. Usually, the ingested substance will only briefly come into contact with the larynx as it is swallowed, causing only minimal inflammation. The exception to this rule is the ingestion of low phosphate or nonphosphate detergents, which can cause a significant degree of swelling of the larynx with very minimal contact. Such detergents contain compounds that easily destroy chemical bonds in the tissues of the body, resulting in destruction of the lining tissue and initiation of an intense inflammatory response. Such swelling may be delayed in appearance and occur as late as 24 hours after ingestion. When it occurs, the swelling may be severe enough to cause breathing difficulty.

 **Red Flag**

Any and all airway problems require immediate attention.

Most household bleaches are not concentrated enough to cause a significant degree of swelling of the airway or damage to the esophagus. However, they may cause swelling and redness in the larynx if they come in contact with it, through a contact laryngitis-type mechanism.

Ingestion of acids, such as hydrochloric acid or sulfuric acid, causes permanent injury to the tissues in which the acid comes in contact. Usually, injury is limited to the esophagus because it is the structure exposed to the acid for the longest period of time. Following the death of the tissue to which the acid is exposed, inflammation occurs in the surrounding tissue. This inflammation is the body's attempt to begin healing from the exposure. The inflammation can result in swelling of the laryngeal tissues, which may cause breathing difficulty.

 **Red Flag**

Any and all airway problems require immediate attention.

Lye and bases cause permanent and deep injury to the tissues with which they come in contact. Such injury usually affects the esophagus but can affect the larynx if it is exposed to the base or lye for prolonged periods of time. The injury results in both the death of the involved tissue (usually to a more severe degree than that seen with acid ingestion) as well as surrounding inflammation. The inflammation may result in swelling severe enough to cause breathing difficulty.

 **Red Flag**

Any and all airway problems require immediate attention.

## What are the symptoms of caustic contact laryngitis?

Symptoms of laryngitis from caustic ingestion may include:

- Difficulty swallowing
- Hoarseness
- Sensation of something stuck in the throat
- Dry throat
- Throat tickle
- Difficulty breathing
- Painful swallowing
- Sore throat

## How is caustic contact laryngitis treated?

- Treatment of laryngitis caused by caustic ingestion first involves removing any remaining material from the larynx and throat with a wash or irrigation with water.
- The airway is assessed for signs of inflammation that might suggest impending airway obstruction, using a flexible laryngoscope or indirect laryngoscopy (mirror visualization of the larynx).
- If the larynx appears severely swollen, a breathing tube may be placed into the airway through the mouth, nose, or neck.
- Administration of intravenous steroids may be recommended to help limit swelling and possibly avoid intubation.
- The esophagus is usually most severely affected by ingestion of caustic compounds; treatment of esophageal injury is emphasized.

### Red Flag

#### **Ingestion of Caustic Agents Produces Many Potentially Life-Threatening Problems**

Caustic ingestions may result in perforation (holes) in the esophagus in the most severe cases, which may result in infection in the surrounding structures from leakage of esophageal materials into the chest. The heart, lungs, and abdominal cavity may become infected by such leakage.

Assessment and treatment of esophageal injuries may include the use of esophagoscopy (in which the esophagus is viewed with a telescope), dye-enhanced swallow studies (in which the patient swallows a dye contrast and x-rays are taken to evaluate leakage), and the use of steroids, depending on the time of assessment relative to the time of ingestion.

## Mechanical Laryngitis

### What is mechanical laryngitis?

Mechanical laryngitis results from trauma from voice use (**phonotrauma**), caused by vocal abuse and misuse syndromes, external or internal blunt or penetrating trauma to the larynx, or coughing.

## Vocal Abuse and Misuse

### How do vocal abuse and misuse cause mechanical laryngitis?

Vocal abuse and misuse result in forceful closure of the vocal folds. The pressure exerted during such closure causes injury to the underlying tissues, which incites an inflammatory reaction. The result is localized swelling and redness of the vocal folds.

- Occasionally the false vocal folds also get swollen and red as in **dysphonia plica ventricularis**.
- The swelling of the vocal folds results in hoarseness and/or raspiness of the voice.

### Distinguishing Between Vocal Abuse and Vocal Misuse

Vocal Abuse	Vocal Misuse
<p><b>Vocal abuse</b> refers to vocal behaviors that result in abrupt trauma to the vocal folds from forceful closure.</p> <p>Examples:</p> <ul style="list-style-type: none"><li>• Yelling and screaming</li><li>• Forceful coughing</li><li>• Forced emesis</li></ul>	<p><b>Vocal misuse</b> includes hyperfunctional voice behaviors during normal voice production.</p> <p>Examples:</p> <ul style="list-style-type: none"><li>• <b>Muscle tension dysphonia</b></li><li>• <b>Dysphonia plica ventricularis</b></li><li>• <b>Psychogenic dysphonia</b></li></ul>

## What are the long-term implications of mechanical laryngitis from vocal abuse/misuse?

Long-term repeated trauma can result in scar tissue formation within the vocal folds, thickening of the vocal folds, vocal fold lesions, and a transformation of the epithelium to tougher tissue (hyperkeratosis or parakeratosis). *(For more information, see Vocal Fold Lesions.)*

Hyperkeratosis and parakeratosis involve the production of keratin in the vocal fold epithelium. Keratin is the substance in skin that gives it toughness and the ability to withstand most minor injuries. Keratin is not usually produced by or present in the vocal folds, as they are not usually exposed to excessive trauma. With repeated trauma, such as through vocal abuse or misuse, the vocal folds begin to produce keratin in an attempt to protect themselves. The presence of keratin in the vocal folds is termed parakeratosis. The presence of excessive amounts of keratin in the vocal folds is termed hyperkeratosis. The presence of either parakeratosis or hyperkeratosis implies chronic injury to the vocal folds. *(For more information, see Laryngeal Atypia and Early Cancer.)*

## How is mechanical laryngitis from vocal abuse/misuse treated?

Treatment of mechanical laryngitis from vocal abuse or misuse includes a short period of reduced voice use or voice rest and sometimes voice therapy to correct the underlying vocal behavior.

## Laryngeal Trauma

### How does laryngeal trauma cause laryngitis?

Laryngeal trauma (external or internal; blunt or penetrating) can result in swelling of the vocal folds, causing acute laryngitis.

### How does internal blunt trauma cause laryngitis?

- Internal blunt trauma can result from pressure on the vocal folds from an indwelling breathing tube. In such cases mild swelling of the vocal folds and the back part of the voice box or larynx (the regions where the breathing tubes usually lie) may occur, resulting in stiffness of the mucosal wave and hoarseness.
- Internal blunt trauma can also result from manipulation in and around the larynx during medical procedures such as intubation, esophagoscopy, direct laryngoscopy, and bronchoscopy. Such manipulation can result in mild swelling of the vocal folds and hoarseness that may last from one to seven days.

### How does external blunt trauma cause laryngitis?

External blunt trauma to the larynx may result from blows to the neck from assault, stage fight injuries during a show, elbow-to-neck injuries while playing basketball, strangulation, or other injuries to the neck (such as falling on the handlebar of a bicycle or hitting the steering wheel during an automobile accident). Such events may injure the laryngeal cartilages and the tissues within the larynx. The injury that ensues may involve mild to extensive swelling (laryngitis). With laryngitis, the voice is hoarse and may be raspy or breathy, depending on the presence of other injuries.

#### Red Flag

##### **Hoarseness May Be a Warning Sign of More Severe Injury**

Laryngitis after trauma to the neck can be a signal of more severe injuries to the larynx, such as fracture or mucosal disruption, and should be investigated promptly by a laryngologist or otolaryngologist.

##### **Early care important in traumatic injury**

Professional voice users should be especially vigilant about seeking care early, as treatment of traumatic injuries is best performed immediately (within 24 to 48 hours of injury). Beyond this time frame, scarring and abnormal healing may begin.

### How do penetrating injuries cause laryngitis?

Penetrating injuries to the larynx can cause laryngitis surrounding the site of the injury. Such injuries may occur as a result of surgery on the vocal folds, stab wounds to the neck, or gunshot wounds.

Laryngitis results from a puncture to the mucosal layer of the vocal folds and contact with the underlying tissues, which stimulates an inflammatory reaction. The laryngitis may cause hoarseness, raspiness, inability to produce sound at certain pitches, sore throat, and sometimes difficulty breathing.

### Red Flag

Any and all airway problems require immediate attention.

The hoarseness, raspiness, and inability to produce sound at certain pitches are due to vocal fold swelling, which limits the vibratory abilities of the vocal fold. Treatment of the penetrating injury itself varies, depending on the cause of the injury.

Laryngitis is best treated by a period of voice rest or light voice use. Keeping the vocal folds lubricated during healing can minimize friction on the vocal folds, thus preventing scarring in the surgical site and aiding the healing process. Lubrication can be accomplished with the ingestion of water, the use of steam or mist humidifiers, the minimization of reflux, and the avoidance of medicines or beverages that tend to deplete the body of fluids. (*For more information, see Reflux Laryngitis.*)

## Allergic Laryngitis

### What is allergic laryngitis?

Allergic laryngitis is laryngeal inflammation in response to inhaled allergens such as pollen, dust, mold, or animal dander.

### How does allergic laryngitis occur?

Allergens are inhaled and stimulate an allergic response in the lining of the larynx and/or blood cells. These allergens either bind to surface antibodies in the larynx or are recognized by blood cells in the larynx as foreign. The allergens stimulate the blood cells to release histamine, which then incites an inflammatory response.

The allergic inflammatory response causes the increased production of mucous, which is usually thick. The thick, viscous mucous absorbs water and dries the vocal folds.

The result is an increase in the shearing forces and friction on the vocal folds during phonation, which causes redness and inflammation of the vocal folds (similar to that produced with mechanical and dehydration laryngitis).

### How is allergic laryngitis diagnosed?

The laryngitis that occurs from allergic exposure usually involves diffuse inflammation of the entire larynx in a pattern similar to that seen with contact laryngitis. The entire larynx will appear red, with mild to moderate swelling. Mucous production is usually increased and thick, resulting in the appearance of an increased amount of phlegm on the vocal folds.

### What are the symptoms of allergic laryngitis?

The symptoms of allergic laryngitis include:

- Hoarseness that is worse during and several hours after exposure to the allergen
- Itchy throat
- Excess phlegm or mucous in the throat
- Feeling of dry throat
- Cough
- Itchy sensation in the throat
- Sneezing

Because the nose and eyes are also sensitive to inhaled allergens, they usually also show signs of inflammation. Signs and symptoms of allergies in the nose and eyes may include:

- Nasal drainage

- Nasal congestion
- Difficulty breathing through the nose
- Excess sneezing
- Itchy nose
- Itchy eyes
- Excess tearing of the eyes
- Red eyes

### **How is allergic laryngitis treated?**

Inflammation from allergic laryngitis will persist until the allergen is completely removed from the system. If repeated or persistent exposure to the allergen occurs, the laryngitis will persist. Antihistamine medications can help lessen the response to future exposures. However, antihistamine medications that are less likely to have drying side effects, such as loratadine, fexofenadine, cetirizine, and desloratadine, should be used.

Attention to hydration is essential in the treatment of allergic laryngitis. The excess mucous that is produced is very thick and viscous in nature, in comparison to the normal mucous that is produced to help lubricate the vocal folds. Drinking water can change the composition of this thick mucous, helping to make it thinner and a better lubricant for the vocal folds.

In some instances, medications such as **guaifenesin** are needed to help thin the mucous. Guaifenesin is found in many cough syrup preparations, but in doses that are too small to have any significant effects on mucous thickness. Pill forms of guaifenesin work well in cases of allergic laryngitis to help thin the mucous secretions.

Humidification of the air with a steam or mist humidifier also helps to maintain good hydration in the larynx.

#### **Key Information**

Patients should consult their physician regarding medication. Patients should also discuss possible side effects from medications.

## **Laryngitis *Sicca***

### **What is laryngitis *sicca*?**

Laryngitis *sicca* is caused by dryness and can result from any process that causes a drying of the vocal folds.

### **What causes laryngitis *sicca*?**

Common causes of laryngitis *sicca* include:

- Dehydration
- Dry atmosphere
- Mouth breathing
- Medications with dehydrating side effects

Dehydration can result from insufficient fluid intake (such as occurs in sick or debilitated persons), excessive ingestion of caffeinated beverages, excessive ingestion of alcoholic beverages, and the use of diuretic medications. Medications with dehydrating side effects include antihistamines, anticholinergics, benzodiazepines, diuretics, and sleep and anxiety pills.

### **How does dryness cause laryngitis *sicca*?**

During phonation, the vocal folds vibrate in a wave-like motion to produce sound. Without adequate lubrication, the gliding, vibratory movement of the vocal folds during phonation is limited, which can result in a cough and inflammation of the vocal folds. Persistent lack of lubrication can cause vocal fold friction, which can in turn cause mechanical laryngitis. (*For more information, see*

### **What are the symptoms of laryngitis *sicca*?**

Hoarseness, vocal fatigue, and lower-pitched voice result from decreased vibratory capacity of the vocal folds as they try to vibrate over the swelling.

### **How is laryngitis *sicca* treated?**

Treatment of dehydration laryngitis involves increasing fluid intake, avoiding drying medications or beverages, and the use of steam/mist humidifiers. Guaifenesin is a medication designed to thin the mucous secretion in the throat. Some patients experience great benefit from this medication and others do not. Guaifenesin is commonly used to treat many types of laryngitis, including laryngitis *sicca*.

## **Thermal Laryngitis**

### **What is thermal laryngitis?**

Thermal laryngitis results from a heat injury to the laryngeal mucosa (lining tissue), usually during smoke inhalation from a closed-space fire or from self-induced injuries, such as with smoking crack cocaine through a crack pipe. The heat from such exposures causes a burn injury, resulting in inflammation.

### **What are symptoms of thermal laryngitis?**

Symptoms from such exposures may include:

- Sore throat
- Difficulty swallowing
- Hoarseness
- Deepening of the voice
- Ear pain
- Huskiness or raspiness to the voice
- Difficulty breathing (in severe cases)

### **How is thermal laryngitis diagnosed?**

The inflammatory response usually consists of redness and swelling of the entire larynx, especially the **epiglottis** and **arytenoids**.

### **How is thermal laryngitis treated?**

Treatment of such injuries involves maintaining adequate hydration, including oral ingestion of water, intravenous fluids when swallowing is difficult, and the inhalation of humidified air. Steroids and/or placement of a breathing tube into the airway (either through the mouth, nose, or neck) may be used when swelling is severe to ensure breathing is not compromised.

# Laryngitis: Vocabulary

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## **Laryngitis**

Inflammation of the voice box (larynx); can result from many causes; specific cause needs to be identified for correct diagnosis and proper treatment plan

## **Inflammation**

Response to injury that results in swelling, redness, and/or pain

 **Advisory Note**

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