



VOICE DISORDERS

# REINKE'S EDEMA

# Reinke's Edema: Highlights

---

## In Brief

Voice disorders can result from the swelling of the non-muscle part of the vocal fold that is right underneath its surface lining (i.e., in the superficial **lamina propria**, also known as **Reinke's space**). This condition is called Reinke's edema, which literally means "swelling in Reinke's space" or "build-up of fluid in Reinke's space."

A change in a vocal fold causes change in vocal fold vibration. The vocal fold swelling makes the superficial lamina propria (Reinke's space) stiff, thus reducing vocal fold vibration – hence voice changes and/or problems. *(For more information, see Anatomy & Physiology of Voice Production.)*

## Common Complaints

Patients usually have a low, raspy, or rough voice. A low voice is particularly striking in women – a male-quality voice in a female.

## Common Causes

Reinke's edema is caused by vocal fold irritation from voice misuse, smoking, and/or conditions that irritate the vocal folds, such as backflow of stomach fluids to the voice box (**laryngopharyngeal reflux**). Reinke's edema typically occurs in middle-aged/post-menopausal women who have a long-term history of smoking cigarettes.

## Treatment Strategies

- Reinke's edema does not go away on its own.
- The cause of Reinke's edema needs to be identified and treated before treatments directed at the voice disorder (such as voice therapy or surgery) are considered.

## Elements of Successful Treatment

Long-term success in the treatment of Reinke's edema requires two, sometimes three approaches.

1. Fixing the underlying cause (e.g., stop smoking, treat reflux, eliminate voice overuse or abuse)
2. Voice therapy
3. In some cases, **vocal fold phonomicrosurgery** *(For more information, see Phonomicrosurgery.)*

## Typical Course

Although Reinke's edema usually develops slowly over the course of many years, the condition can worsen to the point of causing problems with breathing (airway problems).

### Red Flag

Any and all airway problems require immediate attention.

### Red Flag

- According to current best practices, **there is no role for "vocal cord/vocal fold stripping" in treating Reinke's edema.** "Vocal cord/vocal fold stripping" refers to the removal of vocal fold epithelium using microcup forceps. This procedure results in excessive vocal fold scarring.
- If primary causes, such as smoking or reflux, are not addressed, Reinke's edema will recur.

# Understanding Reinke's Edema

## What is Reinke's edema?

### Swelling from Fluid Accumulation in Reinke's Space

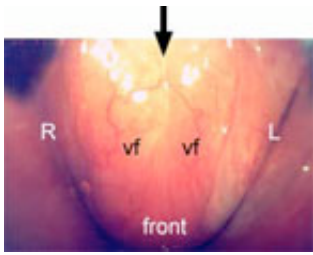
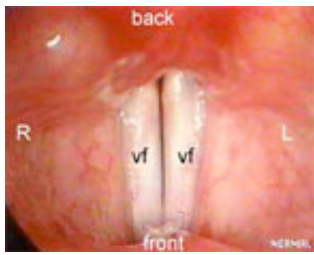
Reinke's edema is the build-up of a gelatinous substance in the layer right underneath the surface lining of the vocal folds (superficial lamina propria or Reinke's space). It may occur in one or both vocal folds.

### Reinke's Space Is Not an "Empty Space"

The superficial lamina propria, or Reinke's space, is not an empty space. It has a defined structure made up of cells, special fibers, and substances made by cells. (For more information, see *Anatomy & Physiology of Voice Production*.)

The superficial lamina propria (Reinke's space) plays an important role in the vibration of vocal folds, which is a key element in sound production.

### A View of Reinke's Edema

Vocal Folds with Reinke's Edema – Closed	Normal Vocal Folds – 95% Closed
	
Vocal folds (vf) with Reinke's Edema in closed position show increased size and volume; arrow indicates midline. <b>Note:</b> Vocal fold length matched in magnification to normal vocal folds	Normal vocal folds (vf) in almost fully closed position show normal size and volume.
<b>Legend:</b> Viewed from above with person facing examiner, vf, vocal folds; R, patient's right; L, left, back and front of voice box.	

### How does Reinke's Edema affect voice?

Vocal fold vibration is critical for production of sound during speaking or singing. Reinke's space, or superficial lamina propria, plays a key role in vocal fold vibration. Along with the lining cover, Reinke's space undergoes a wave-like motion, or "mucosal wave," during speaking or singing. Any change in shape, volume, flexibility, composition, and/or consistency of this layer results in voice changes.

Voice changes are usually described as: hoarse, raspy, low voice quality, as well as decrease in loudness (volume), and difficulties in how high/low a voice can reach (voice range).

#### **i** Key Information

- Reinke's edema is sometimes incorrectly identified as:
  - Laryngeal polyp
  - Polypoid corditis
  - Vocal fold edema
  - Smoker's laryngitis
  - Chronic laryngitis

- The conditions listed above are distinct and can sometimes present at the same time as Reinke's Edema.
- Careful examination is necessary to arrive at the correct medical diagnosis.

# Symptoms of Reinke's Edema

## What are common complaints of patients with Reinke's edema?

The voice complaints of patients with Reinke's edema are similar to those of many other voice disorders. Medical consultation is necessary to identify if a patient's voice changes are due to Reinke's edema.

### Common Complaints of Patients with Reinke's Edema

Common Complaint	Description	How Common
Persistent hoarseness	Rough voice	Common
Low voice	Voice pitch that is below typical range for age and/or gender	Common
Loss of voice brilliance	Loss of luster or edge of voice	Common
Vocal fatigue	Voice tires especially after voice use, usually at end of day	Less common
Voice pitch contraction	Inability to speak in the high vocal range	Less common
Difficulty speaking softly	Fine-tune control of soft sound is difficult	Less common
Pain or neck tightness	Discomfort while talking or singing	Less common
Stridor	Noisy breathing	Less common
Shortness of breath	Feeling that one does not have enough air – especially with exercise	Rare

### Key Information

#### A "Man's Voice" in Females with Reinke's Edema

One of the most common complaints in female patients with Reinke's Edema is that their voice sounds like a man's voice – especially noticeable when speaking over the telephone. In fact, this complaint is one of the main reasons why more women than men with Reinke's edema seek medical care.

### Red Flag

- In rare cases, Reinke's edema can progress to such a severe level that the enlarged vocal folds cause narrowing of the airway, causing breathing difficulties.
- If this scenario does occur, breathing can become noisy (stridor) and can require increased effort, especially during exercise.
- Any breathing difficulty needs immediate medical attention.

## What are other common observations in patients with Reinke's edema?

### Voice Change Over Years – Not Overnight

Reinke's edema develops slowly.

## "Middle-Age" Group of Patients

Reinke's edema is usually identified in patients age 40 and 60 years. However, since Reinke's edema is a gradual, progressive condition, newly diagnosed patients have actually been experiencing the build-up of gelatinous fluid within their vocal folds for many years.

## Usually Identified in Women

For unknown reasons, most patients diagnosed with Reinke's edema are post-menopausal women. However, since many cases of Reinke's edema are not identified, the true incidence of the condition is unknown and could actually be equal for both sexes.

**Possible explanation:** Low voice in women is more noticeable. The lower-pitched voice common in Reinke's edema patients is more likely noticed by females – simply because a low voice is unusual in females, unlike a male's voice. Physicians believe that women report more cases of Reinke's edema, even if an equal number of men have developed the condition.

**Women usually seek surgical intervention:** The overwhelming majority of patients who seek surgical intervention for Reinke's edema are women.

### Key Information

- Physicians believe that most individuals (male or female) who smoke over a long period probably develop a certain degree of Reinke's edema. This condition may be the cause of "smoker's voice," the raspy, low-pitched voice, which is often recognizable after years of tobacco use.
- Although a review of patient complaints provide important clues towards the identification of Reinke's edema by the voice physician, examination of the voice box is critical in the identification of Reinke's edema.

## What are the causes of Reinke's edema?

### Vocal Folds Are Highly Sensitive to Irritants

In general, vocal folds are quite sensitive to any irritation. If irritation persists, voice disorders, like Reinke's edema, will oftentimes result.

### Three Main Causes of Reinke's Edema

Majority of the cases of Reinke's Edema are caused by one or a combination of the risk factors below.

1. **Smoking:** The smoke produced during cigarette, cigar, or pipe use irritates many membranes and structures throughout your airways and lungs, including the vocal folds.  
  
Smoking is a major risk factor for Reinke's edema, just as it is the major risk factor for cancer of the lungs, throat, and voice box. However, not all smokers get Reinke's Edema.
2. **Voice overuse and "abuse":** Constant voice overuse, misuse, or "abuse" can cause irritation to the vocal folds – which may result in several voice disorders, one of which is Reinke's edema.
3. **Reflux or backflow of stomach fluids to the voice box (laryngopharyngeal reflux):** Stomach fluid is highly acidic. Stomach lining cells have special properties to resist irritation from its acidic fluids. The lining cells of the throat and voice box are not resistant however, therefore exposure to stomach fluid backflow (reflux) causes significant irritation to the voice box resulting in various abnormalities and voice disorders, one of which is Reinke's edema. *(For more information, see Reflux Laryngitis.)*

### Common Risk Factors but Different Voice Disorders

Although these three risk factors can cause Reinke's edema, not all individuals with these risk factors develop Reinke's edema.

Physicians are not certain why some people with these risk factors do not develop any voice disorder, or why some develop

Reinke's edema while others develop other vocal fold abnormalities such as vocal fold **scarring**, vocal fold **cancer**, or **vocal fold cysts**.

## **Factors That Worsen Reinke's Edema**

Although the reasons for why only some individuals get Reinke's edema are unknown, factors that worsen risk for Reinke's edema are.

- **How long one has been exposed to common risk factors of Reinke's edema, such as smoking, vocal abuse, and reflux to the voice box:** Longer history of smoking increases risk of voice disorders such as Reinke's edema.
- **How severe the risk factor is:** Worse reflux increases risk of developing voice disorders such as Reinke's edema.
- **Combination or number of risk factors present:** "Double whammy" increases risk of developing voice disorders such as Reinke's edema.
- **Probable genetic, hormonal, and/or behavioral factors:** Genetics may explain why Ms. X gets Reinke's, but Ms. Y, who smokes the same amount, does not.
- **Some medical conditions:** Allergies may affect the risk of developing Reinke's edema.

# Diagnosis of Reinke's Edema

## Otolaryngologist Plays Key Role in Identification of Reinke's Edema

Reinke's edema is typically diagnosed by a surgeon-specialist of ear, nose, and throat diseases (ENT or otolaryngologist) or in some cases, an otolaryngologist who specializes in voice (laryngologist).

## Examination Findings That Lead to Identification of Reinke's Edema

As with all human diseases, identification of the type of voice disorder depends on putting together clues from patient information, findings from medical examination, special exams, and laboratory tests (when performed). (*For more information, see Overview of Diagnosis, Treatment & Prevention.*)

Question Addressed	Examination Technique	Examination Findings
<b>Is Reinke's edema present?</b>	Viewing voice box through rigid or flexible laryngoscopy ( <i>For more information, see Laryngoscopy/Stroboscopy.</i> )	<ul style="list-style-type: none"><li>• Enlargement of one or both vocal fold that move, albeit hampered by the increase in size</li></ul>
<b>How do the vocal folds function?</b>	Evaluation of effects of Reinke's Edema on vocal fold vibration by videostroboscopy ( <i>For more information, see Laryngoscopy/Stroboscopy.</i> )	<ul style="list-style-type: none"><li>• Confirmation of enlarged vocal folds</li><li>• Other abnormalities caused by voice overuse: e.g., vocal fold scarring, nodules, cysts, etc.</li><li>• Other changes caused by reflux of stomach fluids to voice box (e.g., redness, thickening of lining cover, increased mucous production)</li></ul>
<b>Are there any other abnormalities?</b>	Examination for other abnormalities that may also result from the cause or combination of causes of Reinke's edema during laryngoscopy and videostroboscopy ( <i>For more information, see Laryngoscopy/Stroboscopy.</i> )	<ul style="list-style-type: none"><li>• Rule-out of cancer or pre-cancer lesions</li><li>• Increased amplitude of "mucosal wave" of vocal fold vibration</li><li>• Movement of vocal folds "within normal limits" but easily fatigued</li></ul>

### Key Information

- If smoking is the primary cause of Reinke's edema, rule-out of cancer in the voice box, head/neck region, and/or lungs is a priority.
- In general, other than videostroboscopy, no other special testing such as x-rays or **laryngeal electromyography (LEMG)** is required to obtain an accurate diagnosis of Reinke's edema.
- In patients with one-sided Reinke's edema, vocal fold weakness from nerve damage needs to be investigated. In these cases, physician voice specialists will often prescribe a laryngeal electromyography examination. (*For more information, see LEMG.*)

## Voice Disorders That May Be Mistaken for Reinke's Edema

### Common Mislabeled

When Reinke's edema is misdiagnosed, it is often mislabeled as "chronic laryngitis" (see note box) or [vocal fold polyp](#). (For more information, see *Vocal Fold Nodules, Polyps, Cysts, and Reactive Lesions*.)

#### Key Information

##### A Note on "Chronic Laryngitis"

"Chronic laryngitis" is a non-specific term referring to the inflammation of the voice box (laryngitis) that lasts a long time (chronic).

"Chronic laryngitis" is not a specific voice disorder, but rather an abnormal finding whose cause needs to be identified to properly treat the voice disorder.

### Other Mislabeled

Several other conditions can sometimes be confused with Reinke's edema due to similar symptoms and/or similar appearances.

- [Vocal fold edema](#)
- [Polypoid corditis](#)
- [Smoker's laryngitis](#)

## Smoking as a Risk Factor for Both Reinke's Edema and Voice Box Cancer

### Not Present Together: Reinke's Edema and Cancer of the Vocal Fold

Individuals with voice-related problems visit a physician mainly because they are concerned about whether they have laryngeal cancer, since laryngeal cancer is life threatening, although rare. Fortunately, despite smoking as a major risk factor to both conditions, Reinke's edema and laryngeal cancer are rarely seen at the same time in individuals. The reason for this is not presently known.

### Present Together: Reinke's Edema and Pre-cancer of the Vocal Fold – Vocal Fold Atypia

Although laryngeal cancer and Reinke's edema are not usually seen together, pre-cancerous lesions on the vocal fold ([vocal fold atypia](#)) are more frequently observed with Reinke's edema. Since these growths can turn into cancer over time, careful voice box examination needs to be done. (For more information, see *Vocal Fold Atypia and Early Cancer*.)

## Other Confounders to Identification of Reinke's Edema

### Hypothyroidism

Reinke's edema can also be confused with voice disorder caused by low levels of thyroid hormone ([hypothyroidism](#)). Though this condition rarely affects the vocal folds, the voice-related complaints are similar to those of Reinke's edema.

Careful medical investigation needs to be done if hypothyroidism is suspected, especially if other patient complaints or findings are suggestive of low thyroid hormone levels, such as fatigue, weight gain, and hair thinning/loss.

### Asthma

If Reinke's Edema has progressed to the point where it affects breathing (noisy breathing, or stridor), the disorder may be mislabeled as asthma. Again, careful medical examination is necessary. Alternatively, both may be present.

### **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.
- Any breathing difficulty needs immediate medical attention.

## **Key Role of Voice Box Examination**

Accurate identification of voice disorders depends on careful voice box examination of both vocal fold appearance and function. Voice box examination needs to be done. A physician voice specialist is often the best person to perform this examination.

### **Red Flag**

Any and all airway problems require immediate attention.

# Treatment of Reinke's Edema

---

## How is Reinke's edema treated?

The first question that patients with Reinke's edema must answer is: "Do I want treatment?" Since Reinke's edema is a benign condition – and since its treatment often involves difficult lifestyle changes, some individuals simply choose to live with its effects.

In fact, surgery is mainly indicated when patients are sufficiently motivated to eliminate the cause or causes, such as quitting smoking. Surgery is also indicated in patients who may be at a high risk for vocal fold cancer.

## First-Line Treatment: Elimination of Cause or Causes

To improve the voice-related symptoms associated with Reinke's edema, therapy focuses on treating or controlling the condition's three primary causes.

1. Smoking
2. Reflux or backflow of stomach fluids to the voice box ([laryngopharyngeal reflux, or LPR](#))
3. Voice overuse or abuse

Elimination of these causes is absolutely essential to successful treatment of Reinke's edema. The recommended means of eliminating these causes are briefly described below.

1. **Smoking:** Stopping, or severely cutting back, the smoking of cigarettes (and to a lesser extent pipes and cigars). A smoking cessation program is often helpful, especially if you have tried to quit smoking but have failed.
2. **Reflux or backflow of stomach fluids to voice box:** Lifestyle changes minimize backflow of stomach fluids, as do medications (such as proton pump inhibitors) to reduce acid production in the stomach. (*For more information, see [Reflux Laryngitis](#).*)
3. **Voice overuse/abuse:** Vocal prioritization leads to voice preservation – that is, minimizing both in frequency and duration, episodes of voice strain.

Often, by removing the irritation that causes Reinke's edema, these basic treatments can improve the voice disorder – although not completely, as explained below.

## Second-Line Treatment: Restoring Voice Function

Unfortunately, treating the underlying causes of Reinke's edema will usually not completely restore a voice to its normal quality. Second-line treatment plays a role in improving voice function for patients to meet social and professional demands on voice. There are two approaches to second-line treatment.

1. Surgical treatment to improve voice function (phonosurgery)
2. Voice therapy

### Phonosurgery: Key Second-Line Treatment

If hoarseness and other voice complaints persist after treating the underlying causes of Reinke's edema, surgical removal of Reinke's edema material within the vocal folds may be necessary. Surgery to improve voice in patients with Reinke's edema is performed using microsurgical techniques ([phonosurgery](#)). Phonosurgery is done by a qualified voice specialist surgeon or laryngologist. (*For more information, see [Phonosurgery](#).*)

### Care After Surgery – Voice Rest

After surgery, physicians typically ask patients to completely rest their voices (no voice use) for a short period of time (several

days to two weeks). Voice rest allows the area of surgery to heal optimally, and to minimize recurrence of Reinke's edema.

Sometimes, however, even after vocal rest is completed, voice may remain breathy, weak, and maybe even high-pitched for a short period of time (four to six weeks) after surgery. Typically, these symptoms will subside after the vocal folds have fully healed from surgery and may disappear even sooner with voice therapy.

### **Possible Complications**

- **Scarring from phonosurgery:** Although the small, precise instruments used in phonosurgery are designed to minimize the risk of scarring, it is a risk with surgical incision. Additionally, incomplete voice rest immediately following surgery can prevent proper healing of vocal folds, which can lead to scarring.
- **Voice fatigue or strain:** After surgery for Reinke's edema, patients may experience voice fatigue or strain. These complications are rare and usually result from postsurgical scarring or poor speaking technique from failing to adhere to voice therapy.

### **Voice Therapy: A Key Component of Treatment of Reinke's Edema**

Following voice rest after surgery, voice therapy is often recommended to assist in adjusting to the new shape, movement, and function of the surgically corrected vocal folds. Briefly, voice therapy helps rehabilitate voice, as well as re-train patients to speak with correct form and without harming the vocal folds. *(For more information, see Voice Therapy.)*

For Reinke's edema patients, voice therapy is most likely to be prescribed for three reasons.

**Reason 1:** If the underlying cause of Reinke's Edema was voice misuse or abuse – voice therapy can help ensure that this abuse does not continue.

**Reason 2:** If surgery for Reinke's edema has significantly altered the shape of the vocal folds (more likely in patients who had developed significant amounts of Reinke's material build-up), producing sound may seem awkward at first. Fortunately, voice therapy can help re-train these individuals how to speak.

**Reason 3:** If patients with Reinke's edema have developed "bad voice habits" to compensate for the voice disorder, voice therapy can help patients re-learn proper technique.

#### **Key Information**

##### **Surgical Treatment Alone Is Not Enough**

When surgical treatment is done for Reinke's edema without first treating the underlying cause(s) of the disorder – LPR, smoking, or vocal abuse – patients often experience a recurrence of Reinke's edema or persistence of their voice problem despite the success of the surgical procedure itself.

#### **Red Flag**

##### **Current Best Practices: No Role for "Vocal Cord / Vocal Fold Stripping"**

Surgical treatment for Reinke's edema should use precise phonosurgical technique.

"Vocal cord / vocal fold stripping" refers to the removal of the top cell layer of the vocal fold (**vocal fold epithelium**) using microcup forceps. This stripping of the vocal fold epithelium results in severe vocal fold scarring and abnormal voice with very little promise for recovery.

Vocal cord / vocal fold stripping has been shown to result in scarring in the deeper layers of the vocal folds in the **superficial lamina propria** and even down to the **vocalis muscle**. The procedure can also result in the formation of scar tissue between the vocal folds or **webbing** which, if severe, can decrease the size of the airway passage thus causing shortness of breath.

According to current best practices, there is no role for vocal cord / vocal fold stripping in treating Reinke's edema.

** Key Information**

**Steroid Therapy Is Not a Medical Treatment for Reinke's Edema**

Steroid medication is not a treatment for the swelling in Reinke's edema.

**Steroid Therapy Considered Only for Emergency Airway Problems**

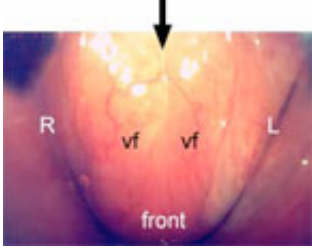
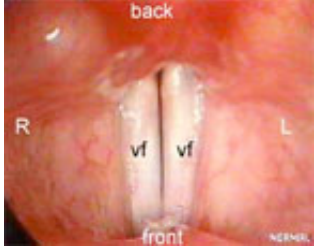
If breathing is impaired in patients with Reinke's edema, steroid therapy may be prescribed to improve airway access while other treatment methods (reflux treatment, voice therapy, and/or surgery) are given.

** Red Flag**

Any and all airway problems require immediate attention.

# Images of Reinke's Edema

## A View of Reinke's Edema

Vocal Folds with Reinke's Edema – Closed	Normal Vocal Folds – 95% Closed
	
<p>Vocal folds (vf) with Reinke's Edema in closed position show increased size and volume; arrow indicates midline.</p> <p><b>Note:</b> Vocal fold length matched in magnification to normal vocal folds</p>	<p>Normal vocal folds (vf) in almost fully closed position show normal size and volume.</p>
<p><b>Legend:</b> Viewed from above with person facing examiner, vf, vocal folds; R, patient's right; L, left, back and front of voice box.</p>	

This diagram can be found in Reinke's Edema: Understanding the Disorder.

# Reinke's Edema: Vocabulary

---

## **Reinke's Edema**

"Swelling in Reinke's space"; a voice disorder caused by accumulation of gelatinous substance in Reinke's space

## **Reinke's Space (Superficial Lamina Propria)**

Layer just underneath the surface lining of the vocal fold; composed of cells, special fibers, and other substances (extracellular matrix); has key role in vocal fold vibration

## **"Stripping"**

A "radical" surgical procedure that removes ("strips") the top layers of the vocal folds resulting in severe vocal fold scarring and abnormal voice. Due to the resultant damage, this procedure is at present rarely used

 **Advisory Note**

Patient education material presented here does not substitute for medical consultation or examination, nor is this material intended to provide advice on the medical treatment appropriate to any specific circumstances.

**All use of this site indicates acceptance of our Terms of Service.**