

Benign Vocal Lesions - Nodules, Polyps, Cysts

Ken W. Altman MD, PhD

What are Benign Vocal Lesions?

Benign vocal lesions are non-cancerous growths of abnormal tissue on the vocal folds. They include "singer's" nodules, isolated polyps, polypoid degeneration (Reinke's edema), and cysts. Since these lesions are not cancerous, they are usually not life threatening. However, lesions may affect voice quality and excessive growth may affect breathing patterns. A clinical diagnosis of nodules, polyps or cysts does not rule out a malignancy (cancer) unless the lesion resolves with treatment or it is biopsied and is pathologically benign. The lesion may also be a benign neoplasm such as papilloma or leukoplakia that would not resolve with traditional treatment for nodules, polyps or cysts.

What Causes These Lesions?

Each of these lesions has a potentially different cause, but there are common factors that contribute to their development. Generally, benign vocal lesions occur in response to injury, but are also well known to have multiple causes. The initial injury may be brought on by

- Chronic vocal use/misuse. For example, excessive loudness and use in a teacher, or singing excessively with poor breath support in a singer
- Acute vocal misuse. For example, screaming at the football game, or an uncontrolled coughing spell during an upper respiratory infection.
- Trauma resulting from infection
- Trauma from gastric reflux (GERD) injuring the laryngeal mucosa (protective cover of the vocal folds).

Other factors that contribute to chronic irritation of the larynx with excessive throat clearing can include

- [Post-nasal drip](#) from resulting from allergic rhinitis,
- [Chronic sinusitis](#)
- Exposure to chemical irritants such as that from [tobacco use/abuse](#).
- Pulmonary disease which may lead to poor breath support during speech or cough-variant asthma
- Hypothyroidism which may lead to an unusually low-pitched voice and speech/singing compensation for this low pitch may result in strain/misuse of the voice
- Poor [vocal habits](#)
- [Medications that may affect the voice](#)

How are Nodules, Polyps and Cysts Diagnosed?

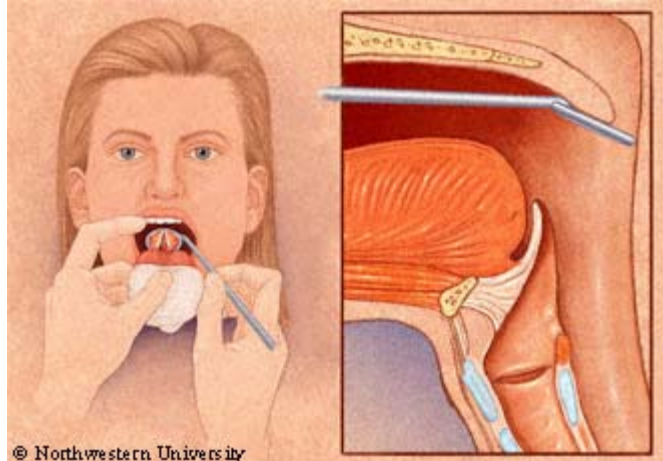
The following are important:

- Time of onset of dysphonia (abnormal voice)
- Factors that accompanied the onset (such as an upper respiratory infection)
- Is hoarseness worse in morning, evening or all day?
- The presence of vocal fatigue (voice tires easily with use)
- Pain or strain with continued voice use
- Singing range limitations

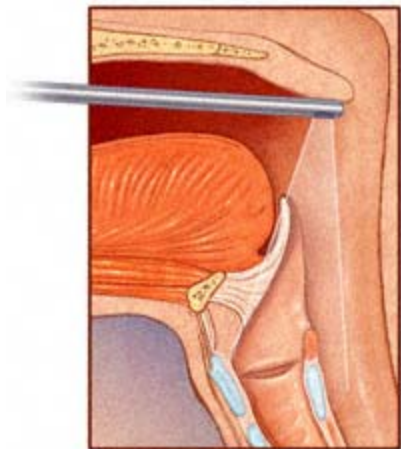
- Voice breaks or "drop-outs" while holding a note
- Past medical history
- List of medications (including homeopathic remedies), and medication allergies

Physical examination includes a complete head and neck exam by an otolaryngologist. Evaluation of the larynx requires one or more of the following:

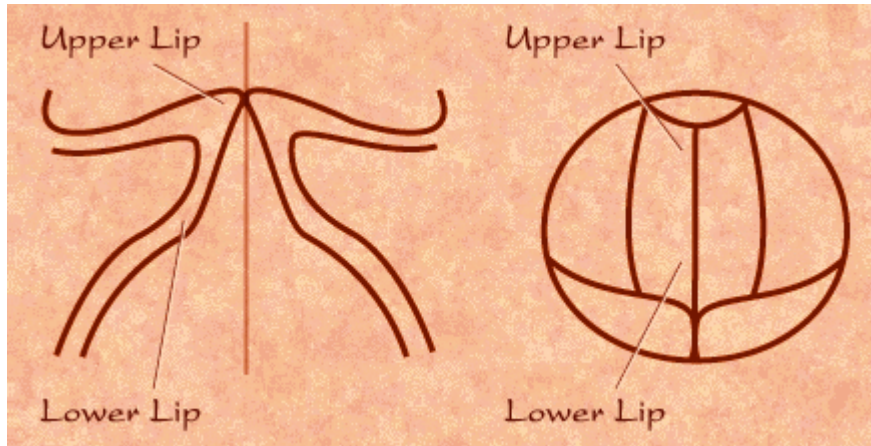
- Mirror exam - a mirror is inserted to the back of the mouth, and the larynx is viewed with the use of a headlight. It provides good evaluation of mucosa color, but visualization is limited.
- Flexible nasopharyngolaryngoscope (NPL) - after application of painless topical anesthesia, a flexible "telescope" is inserted through the nose, to the back of the throat, and down to visualize the larynx. The NPL is especially useful for particular laryngeal problems.
- Rigid endoscopy - a rod-like telescope with an angled tip allows the otolaryngologist to "look around the corner" to see the larynx. This exam provides excellent view and color evaluation, and is typically painless for the patient.



Upper left: Mirror exam. Upper right: Cross section, close up view of the same mirror exam. Right: Cross section, close up view of a rigid endoscopy exam.



- Videostroboscopy - may be performed with either rigid or flexible telescopes. During this exam a microphone is placed on the patient's neck to pick up the voice frequency. A strobe light that is slightly desynchronized to the voice frequency is then flashed at the larynx. The vocal fold histology includes multiple layers with different mechanical properties, and a mucosal wave is produced during phonation. The desynchronized strobe light captures different stages of the laryngeal vibration and its image on video appears as a mucosal wave in slow motion. Videostroboscopy may be necessary to describe the nature of a lesion, with important effect on treatment course, indications for surgery, and prognosis.



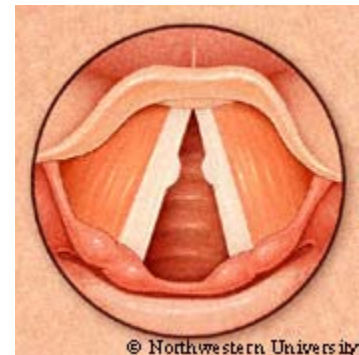
The cross hatching seen in the top view is the contact area for the vocal folds during a mucosal wave.

Vocal Fold Nodules

Nodules occur more often in adult women, but also occur in male adolescents. Teachers, stock traders and other vocal professionals who chronically use their voices in loud environments are particularly prone to development of nodules. Symptoms include chronic or recurrent hoarseness, loss of ability to sing high notes softly, frequent voice breaks, increased breathiness and vocal fatigue.

Nodules appear as bilateral symmetric swellings, usually at the junction of the anterior and mid-third portions of the vocal folds. Since the anterior 2/3 (membranous) portion of the vocal folds participate in phonation, shearing and collision forces occur maximally at the midpoint. Vascular congestion results with edema of the mucosa, and fluid in Reinke's space (for more information, see [vocal fold histology](#)), and thickening of the overlying epithelium.

Since nodules and polyps usually result from overuse and/or poor vocal technique, treatment centers on speech therapy and guidance, and sometimes requires a period of voice rest. Surgery is rarely indicated for vocal nodules.



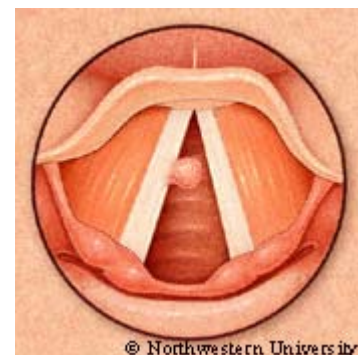
Vocal fold nodules.

Vocal Fold Polyps

Polyps occur more often in males (but may occur in either gender) after intense intermittent voice use/abuse, and there is often a history of aspirin or anticoagulant use.

Isolated vocal polyps are usually unilateral and either sessile (broad-based) or pedunculated (small stalk). They are thought to occur from breakage in a capillary (small blood vessel) in Reinke's space, with leakage of blood, localized edema (swelling), and eventual organization into a fibrotic polyp.

Treatment centers on voice rest, medical treatment for sources of laryngeal irritation when indicated, and occasionally steroids to bring down the acute surrounding edema. Surgery is often indicated in cases that do not resolve with the above measures.

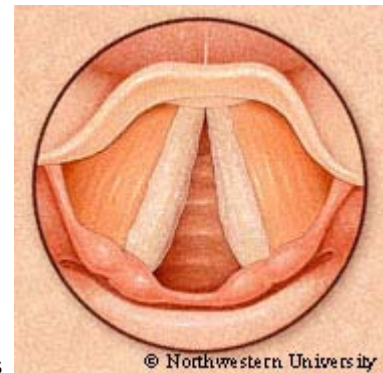


Vocal fold polyp.

Polypoid Degeneration (Reinke's Edema)

Reinke's edema is a bilateral, diffuse swelling of Reinke's space with excess gelatinous-like material that results in an irregular, sac-like appearance of the vocal folds. It is most commonly caused by tobacco/smoke exposure, but may also be aggravated by gastric reflux, hormonal changes such as hypothyroidism, and chronic vocal abuse. Reinke's edema produces a deep, husky-sounding voice.

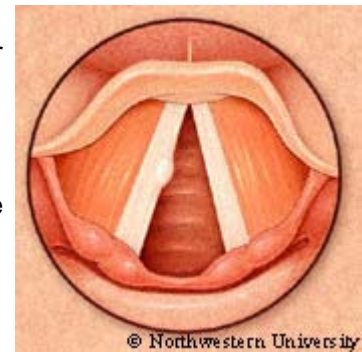
If the edema is identified early, then stopping smoking (or other irritation) is often effective in resolving the polypoid edema. Surgery is sometimes effective in improving vocal quality, but rarely restores the voice to normal. Patients with Reinke's edema require close follow-up by the otolaryngologist since the factors that contributed to the disorder (such as tobacco) may also contribute to the development of laryngeal carcinoma (cancer).



Reinke's Edema.

Vocal Fold Cysts

Patients with vocal cysts may have a history similar to those patients with vocal nodules. A large cyst may cause the patient to develop vocal strain or muscular tension to compensate for poor vibration and closure of the vocal folds. Also, unusual vibratory patterns with the cyst present may cause "diplophonia" (voice with two sounds). Vocal cysts occur more often in women, and may vary in size with the menstrual cycle in some patients. Cysts are almost always unilateral (appearing on only one side), but a large cyst may cause a "reactive" swelling on the opposite (contralateral) vocal fold.



Vocal fold cyst.

Cysts are of two types; mucus retention and epidermoid

- Mucus retention cysts result when a glandular duct becomes obstructed and retains secretions (usually after an upper respiratory infection with vocal overuse)
- Epidermoid cysts result from either minor glitches during embryologic development, or from healing injured mucosa that buries skin. A ruptured cyst may result in a scar.

Treatment initially focuses on maximizing medical management of irritants, improving vocal habits, and vocal behavior modification through speech therapy. While some vocal professionals may clinically improve to be able to use their voice with minimal limitation, vocal cysts typically do not completely resolve and typically eventually require surgery.

Indications for Biopsy and Removal

- A lesion that is suspicious for cancer or a neoplastic process
- An enlarging lesion
- A lesion that failed medical and speech behavioral therapy
- The patient's vocal performance is impaired and surgery is likely to improve it

Important Points to Improve Rehabilitation From Surgery

- The patient should have realistic expectation of post-surgical improvement
- Good vocal habits
- Maximized medical treatment of related disorders
- Good speech behavior aided by speech therapist
- Period of strict post-operative voice rest
- Gradual return to maximal voice use
- Follow-up videostroboscopy to guide voice use with surgical recovery

Conclusions

Benign vocal lesions include vocal nodules, polyps, polypoid degeneration and cysts. Each of these lesions has a different cause based on the vocal fold histology. Videostroboscopy may be used by an otolaryngologist to help diagnose these lesions. Surgical treatment, when indicated, should be precise with an adherence to the principles of advanced surgical technique.

Author

Ken W. Altman MD, PhD