



Dysphonia

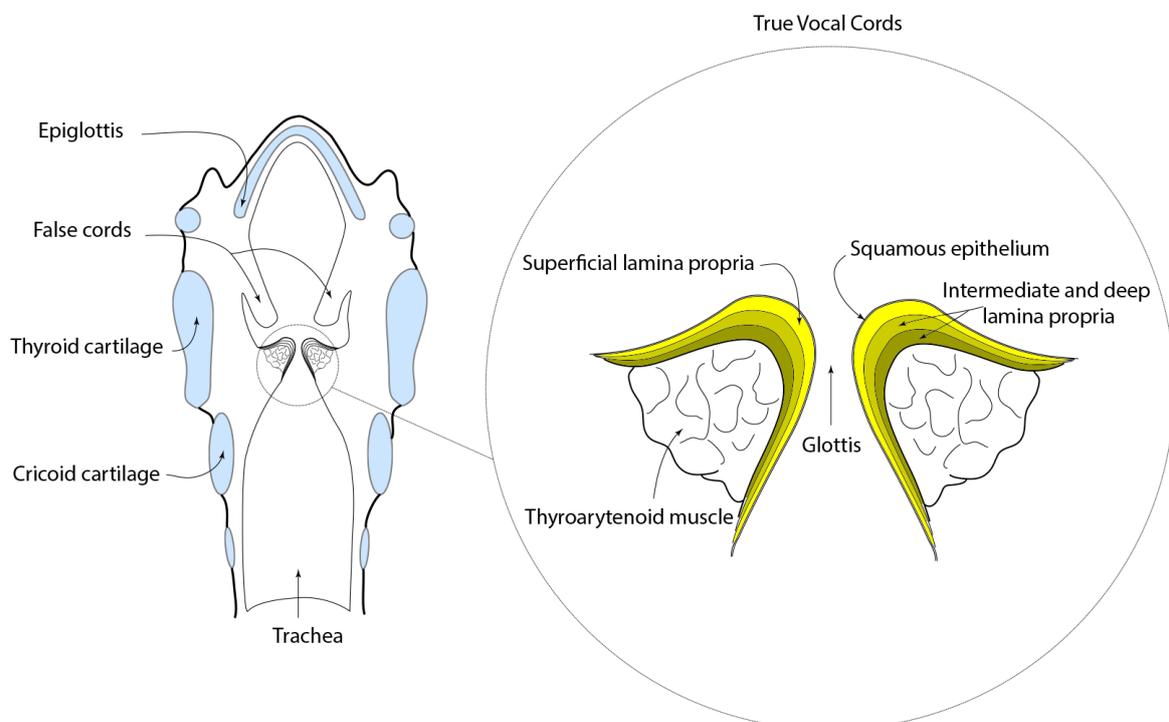
Terminology

It is important to understand a few definitions when thinking about voice and speech problems:

1. Dysphonia is another term for hoarseness. This in turn is a disorder of voice production at the level of the larynx (voice box). It has nothing to do with articulation of speech. Voice may be deeper, higher pitched, less flexible or weaker, for example.
2. Dysarthria is a speech problem. The quality of sound from the larynx may be entirely normal but if the lips, tongue, teeth and palate do not work in a coordinated way speech production will be affected.

How is voice produced?

Voice, the sound produced by the larynx, is produced by vibrations in the mucosa overlying the vocal cords. The mucosa is mobile and vibrates freely when the vocal cords are brought together and air is passed over them. The vibration arises due to the simple physics of air passing through a narrowing.



The diagram shows a cross-section through the larynx and true vocal cords. The intermediate and deep lamina propria layers together form the vocal ligament. They don't vibrate during phonation. The superficial lamina propria (yellow) and the overlying epithelium do vibrate to produce sound as air passes over them from the lungs.

Causes of dysphonia

Normal phonation requires two things: a healthy and mobile mucosa overlying the vocal ligament, and mobile vocal cords that can move towards each other. Common and important diseases that cause dysphonia are listed below starting with disease of the mucosa.

Mucosal diseases

Disease that alters the mobility of the laryngeal mucosa or make the weight of the mucosa greater will change the sound of the voice. The important ones are listed here:

Laryngitis

Laryngitis may be acute or chronic. Acute causes are due to viral infection, certain uncommon bacteria, and excess usage such as shouting. Chronic laryngitis, that lasting more than three weeks, is caused by smoking, habitual over usage and probably also by acid reflux disease.

Viral infection is self-limiting and often associated with other symptoms of upper airway infection: sore throat, symptoms of the common cold, mild fever, and cough. It lasts no more than a week or so and requires vocal rest and simple analgesics.

Vocal trauma occurs following shouting or strenuous vocal usage. Treatment is with vocal rest and changing voice usage habits.

Irritation by smoking causes longer term inflammatory changes and hence long term hoarseness. Generally, the mucosa becomes swollen and heavy causing a rough voice. Severe forms are known as Reinke's oedema. Treatment is by stopping smoking. Severe cases of vocal cord swelling may require surgery to reduce oedema.

Vocal nodules arise in cases of repetitive trauma, such as in untrained singers or children who shout. Nodules form on the free edge of the vocal cord at the junction between the anterior third and the posterior two thirds of the cord. They are bilateral.

Treatment is by changing vocal habits, getting voice coaching for singers and input from Speech and Language Therapists. Sometimes the nodules must be removed surgically.

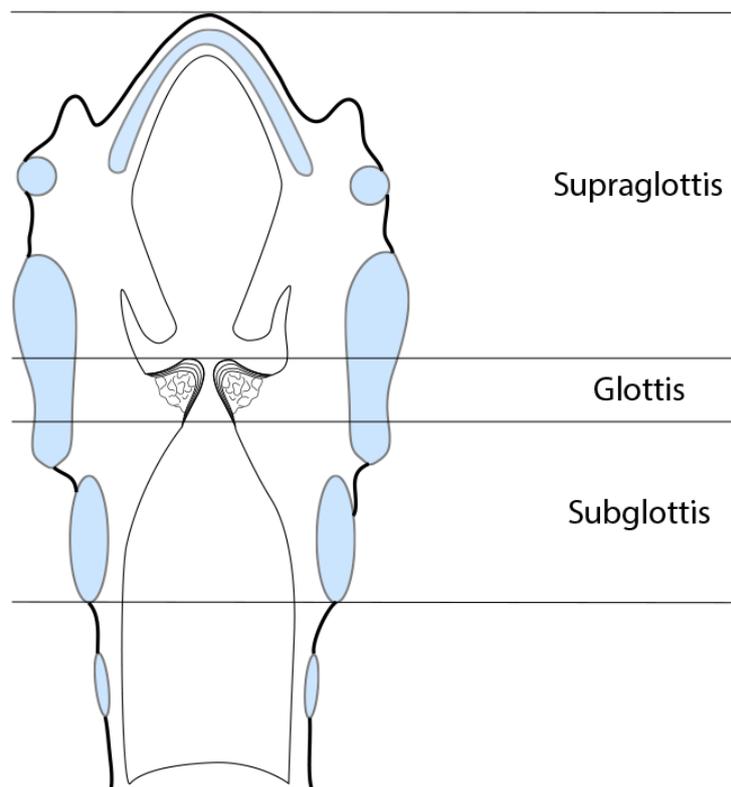
Cases of chronic laryngitis associated with acid reflux disease need careful clinical evaluation and treatment with proton pump inhibitors and alginates.

Hypothyroidism is known to cause hoarseness and this is due to increased weight of the vocal cords due to oedema.

Carcinoma

This is clearly the most important cause of hoarseness. It may be associated with any of the red flag signs or symptoms listed in the table depending on the extent of the tumour and how far it has progressed outside the larynx.

This diagram shows the three regions of the larynx: the supraglottis lies above the vocal cords, the glottis is the true vocal cords and the subglottis lies below the cords as far as the lower edge of the cricoid cartilage. Anything below that is the trachea.



Generally, carcinomas on the vocal cord present early as they cause persisting hoarseness. The vocal cords themselves have a poor blood supply and lymphatic drainage and this gives tumours here a better prognosis.

Tumours arising in the supra glottis or sub glottis present later as they can grow without causing symptoms for some time and thus have the opportunity to present with a metastasis in a neck node. The supra and sub glottis have relatively richer blood and lymphatic supplies than the vocal cord and this promotes the risk of spread of disease.

It is caused by smoking in the vast majority of patients.

Treatment is beyond the scope of the course but will usually consist of surgery, surgery with radiotherapy, or radiotherapy alone. The choice depends on the size of the tumour at presentation and its underlying nature.

Diseases limiting vocal cord mobility

Vocal cord palsy is the most common cause of reduced mobility of the cord although rheumatoid arthritis can affect the crico-arytenoid joint as can trauma. Cord palsies are more common on the left side due to the longer course of the left recurrent laryngeal nerve.

Overall the majority of vocal cord palsies are iatrogenic. These account for between 40 and 50% of cases. Surgery to the thyroid, cervical spine, carotid endarterectomy, and thoracic procedures (PDA ligation, aortic surgery or CABG) all put the recurrent laryngeal, or its parent nerve the Vagus, at risk.

Malignancy makes up about 20% of causes: carcinomas in the thyroid, left bronchus and Pancoast's tumour, and upper oesophagus.

Idiopathic causes make up another 20% and the remaining causes include neurological disease, trauma, and myopathy.

Management of vocal palsy will be directed at the underlying cause and at the larynx itself. If only one vocal cord is paralysed then a course of speech therapy may well be all that is required to improve voice function. It aims to encourage the normal cord to compensate for the weakness of the other. If this fails, the paralysed cord can be moved surgically towards its opposite.

Bilateral cord palsies, most common after thyroid surgery, may require emergency airway management such as a tracheostomy if the paralysis causes airway obstruction.

Laryngitis and systemic diseases

The larynx can be the site of manifestation of systemic diseases. These are uncommon in western clinical practice but disease such as tuberculosis, leprosy, syphilis may present with laryngeal lesions and hence hoarseness.

Fungal infections of the larynx are seen in patients who use long-term inhaled steroids.

Sarcoidosis, amyloidosis and granulomatosis with polyangiitis are other diseases that can present in the larynx on rare occasions.

Other, much rarer causes include hydatid disease of the thyroid, leishmaniasis, histoplasmosis, aspergillosis, trichinosis and schistosomiasis.

Investigation of dysphonia

All patients require a good history and a thorough examination. At this point the cause of the dysphonia will usually be evident and no further investigation is required. However, in cases of vocal cord palsy or obvious carcinoma of the larynx patients will undergo radiologic evaluation with a CT scan performed from the skull base down as far as the aortic arch. This will detect tumours in all of the relevant areas described above and assess the extent of tumours. A Chest X-ray should be performed if no CT scanning is available.