

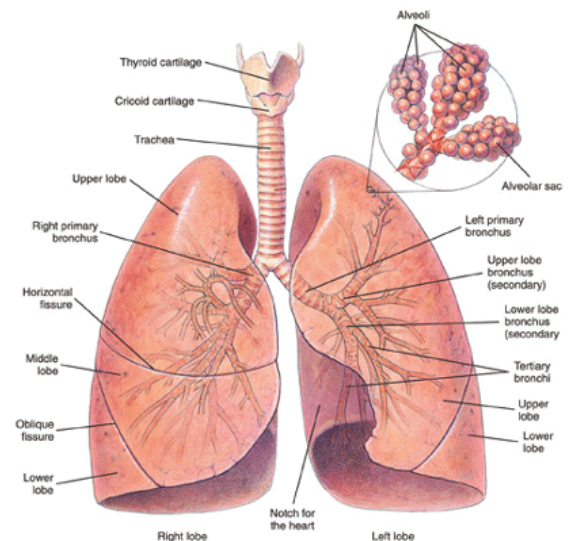
## MICROLARYNGOSCOPY AND BRONCHOSCOPY (EVALUATION OF AIRWAY)

The airway as discussed in the above topic refers to the breathing tube starting from the mouth to voice box (larynx) extending to the distal parts of the lungs (bronchi and bronchioles).

The airway can be evaluated in some cases by looking at pictures taken using x-rays (chest x-rays, CT scans) or magnetic resonance imaging (MRI). However, sometimes this is not enough.

In these cases, the airway can be examined directly by using a small metal tube called an endoscope. The specific endoscopes used to look at the airway are called laryngoscopes and bronchoscopes.

Laryngoscopes are used to look at the upper throat and vocal cords (voice box or larynx). Bronchoscopes are used to look at the windpipe (trachea) and the distal parts of the lungs (bronchi and bronchioles).



### What are reasons the airway may need to be looked at directly?

There are two main reasons to look at the airway directly.

1. The first reason is to diagnose a problem. An example of this would be stridor or noisy breathing suggesting an obstruction (blockage) in the airway. Looking at the airway directly will help make an accurate diagnosis so that the appropriate treatment can be carried out.
2. The second reason to directly look at the airway is to treat a problem. A good example of this is the removal of an object in the airway (foreign body). The object's location can be directly visualized, and then special tools can be accurately placed to grab the object and pull it out, effectively treating the problem with minimal complications.

## MICROLARYNGOSCOPY

### What is a Microlaryngoscopy?

Laryngoscopy is a procedure that allows your physician to look at your larynx (voice box) using a laryngoscope. "Micro" refers to getting a very close (magnified) view of the area to see every tiny detail. This can be done with a special telescope or operating microscope.

### What are the indications for Microlaryngoscopy?

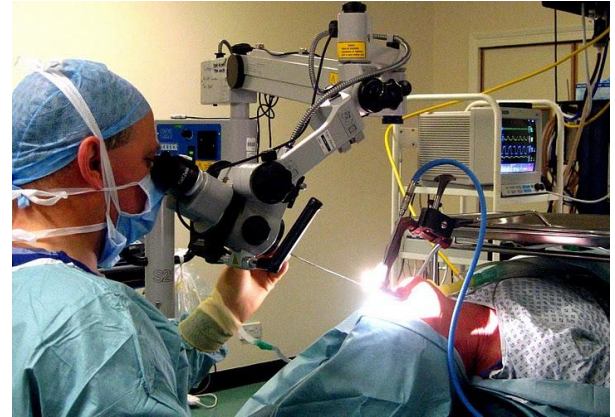
Microlaryngoscopy is especially useful for conditions in which evaluation or treatment of the vocal cords or immediate surrounding airway needs to be performed. Problems involving the

vocal cords/folds can result in hoarseness, breathing or speech abnormalities. Laryngoscopy is commonly used to evaluate these symptoms. Microlaryngoscopy gives the surgeon the ability to view the larynx in detail. This is vitally important because minute (very small) changes can produce large changes in a person's voice.

### **What is involved with Microlaryngoscopy?**

Microlaryngoscopy does not usually require an overnight stay in the hospital. It is generally performed under general anesthesia (the patient is asleep during the procedure) with the patient lying on the back.

With the head tilted back (to make the airway as straight as possible), a laryngoscope is placed in the mouth to look at the larynx (voice box). It also pushes the tongue out of the way. If the patient is old enough to have upper teeth, they are protected with a tooth guard. The involved area is then visualized and the view is magnified (enlarged) using an endoscope (telescope). This is usually attached to a small video camera.



Procedures that may be performed during microlaryngoscopy are numerous, and include removal of polyps or masses on or around the vocal cords or to correct deformities of the vocal cords themselves. These procedures involve the use of special tools and techniques, and may include use of the laser.

The length of surgery depends on the reason the procedure is being performed (to simply evaluate the area, or to actually remove bumps or masses). The procedure usually lasts 1-2 hours.

### **What are the risks and complications of microlaryngoscopy?**

The more common risks include chipping a tooth or a temporarily numb tongue (from pressing on the tongue during the procedure) which can last up to 6 weeks. Other possible risks include excessive bleeding or breathing difficulties after the procedure. All known complications are rare.

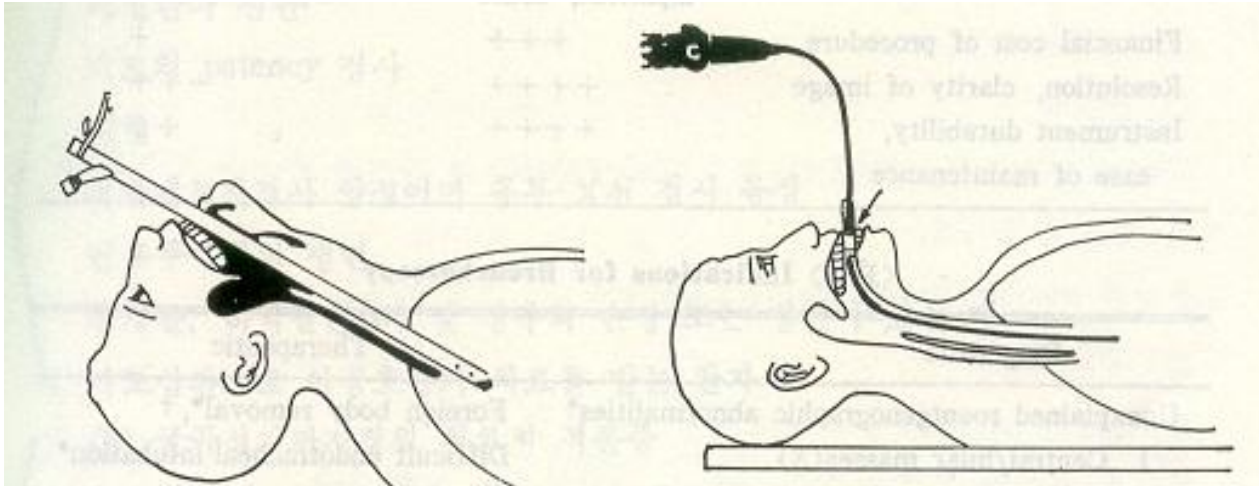
## **BRONCHOSCOPY**

### **What is Bronchoscopy?**

Bronchoscopy is the name for the procedure using a bronchoscope (hollow metal tube) to directly look at the airway. The bronchoscope contains a telescope to better visualize all parts of the airway under magnification.

There are two types of bronchoscopes: rigid and flexible.

1. Rigid Bronchoscopy indicates the hollow metal bronchoscope tube used cannot bend.
2. Flexible bronchoscopy uses a bronchoscope tube that can bend in the front, back, and side-to-side during the procedure (in other words, is flexible).



### **What are the indications for rigid bronchoscopy?**

Usually by the time rigid bronchoscopy is considered, other tests may have already been performed that suggest a respiratory (breathing related) problem. Other times, respiratory symptoms continue to be present, although no reason can be found. Rigid bronchoscopy is very valuable in helping to diagnose these various respiratory symptoms and problems. Examples of these include stridor (noisy breathing), chronic cough, hoarseness, asthma with unexpected symptoms (atypical asthma), and suspected foreign body evaluation. Stridor, depending on the type, is evaluated with rigid bronchoscopy to look at the anatomy, and flexible laryngoscopy to evaluate function.

The rigid bronchoscope is more effective when removing lesions, performing biopsies (getting a sample of tissue), foreign body removal, and removing thick airway secretions (fluids) than the flexible bronchoscope. CO2 laser surgery must be performed with a laryngoscope or rigid bronchoscope.

### **What is involved with a rigid bronchoscopy?**

Rigid bronchoscopy is almost always performed with the patient under general anesthesia (fully asleep). The patient's head is tilted back to straighten the airway as much as possible. If teeth are present, a tooth guard is usually placed along the upper teeth to help prevent chipping. A laryngoscope (an instrument that holds back the tongue) is inserted that helps the surgeon visualize the voice box (larynx). A longer metal tube (the bronchoscope) is then inserted into the airway. Through the bronchoscope, the surgeon can then use telescopes, special tools, laser beams, and small cameras, among other things, depending on the reason the procedure is being performed.

The entire airway is carefully evaluated, as the telescope is moved further and further along the airway, looking for any abnormalities. Many times the size of the airway is measured to determine improvement in a condition.

### **What are the complications of this procedure?**

With an experienced surgeon, bronchoscopy is a very safe procedure. The most common complications are due to irritation to the airway and vocal cords from the

bronchoscope itself. Other complications can include bleeding, temporary breathing problems during and after the procedure, and problems with the heart rhythm. Rarely, air can leak out around the windpipe (trachea) (called a pneumomediastinum) or the lung (called a pneumothorax).

### **What are the indications for flexible bronchoscopy?**

Flexible bronchoscopy is more commonly used for the evaluation of wheezing or chronic cough. This is usually done by a pediatric ENT or pulmonologist. It is also preferred in patients who cannot tolerate rigid bronchoscopy. Among these are patients who cannot tolerate general anesthesia (being put fully to sleep) or those with upper spine disorders (because their necks can not be positioned appropriately for rigid bronchoscopy). Other indications for this procedure include patients with a tracheotomy (breathing tube inserted through a hole in the neck), recurrent lung infections, and the evaluation of coughing up blood (hemoptysis).

### **What is involved with flexible bronchoscopy?**

Flexible bronchoscopy does not require the use of general anesthesia. This procedure is performed by giving the patient a sedating (relaxing) medication, so that they continue to breathe on their own. This is important when evaluating conditions where the patient's natural breathing movements must be observed. In contrast to rigid bronchoscopy, the head does not need to be tilted back. Although, the flexible bronchoscope can be inserted into the mouth, it is usually inserted into the patient's nose. The nasal passages and upper throat are sprayed with a numbing spray, the bronchoscope is inserted, and the patient's nasal (nose) structures are then examined. The larynx (voice box) can then be examined fully. After this, more numbing medication can be applied to the larynx, and the bronchoscope is then advanced further down the airway, all the way to the bronchi (breathing tubes in the lungs) if required.

### **What are the complications of flexible bronchoscopy?**

Since the flexible bronchoscope is inserted through the nasal passages, occasionally bleeding from the nose (epistaxis) can result. Otherwise, the flexible and rigid bronchoscopes can result in similar types of complications; however, both are very safe procedures and rarely result in complications.