



## **Airway Clearance Indications: Obstructive Lung Disease**

### **Bronchiectasis**

Bronchiectasis is a progressive disease process in which the airways of the lung are abnormally dilated (enlarged) and permanently damaged. Bronchiectasis is usually acquired due to severe, chronic, repeated infection and inflammation of the airways. In rare cases, bronchiectasis may be congenital (present at birth) as the result of structural abnormalities of the airways. The development of bronchiectasis is a hallmark of several recognized pulmonary diseases and it is frequently categorized as either “cystic fibrosis bronchiectasis” or “non-cystic fibrosis bronchiectasis” to reflect the differences in presentation and severity generally seen in cystic fibrosis bronchiectasis compared to bronchiectasis from other underlying disorders. Cystic fibrosis is believed to be responsible for about 50% of all cases of bronchiectasis in the United States, although the rate of non-CF bronchiectasis is on the rise and efforts are currently underway to better classify the disorder.

#### **What Happens in Bronchiectasis?**

The airways are kept clean of environmental debris and infectious agents by a system called mucociliary clearance. Mucociliary clearance relies on mucus of the right quantity and consistency working in harmony with the beating action of motile cilia to sweep debris-laden mucus to the large airways and throat where it can be coughed out or swallowed. In bronchiectasis, intense pulmonary inflammation creates excess accumulation of infected mucus which overwhelms the system and impairs mucociliary clearance. Un-cleared mucus collects and pools in the enlarged, floppy and damaged airways, eventually scarring, widening and weakening them. These enlarged, weakened bronchi become fertile ground for additional mucus accumulation, resulting in a vicious cycle of impaired mucociliary clearance, chronic infection and more damage to the airways. Bronchiectatic airways may become plugged with mucus or may even collapse in their weakened state, resulting in obstructed airflow. Over time, severe damage to the airways may lead to respiratory failure and the need for lung transplant.

#### **How Airway Clearance Therapy Can Help Bronchiectasis**

Bronchiectasis is thought to be an irreversible condition and treatment is aimed at slowing the progression of the disease and maintaining a quality of life for patients. Keeping the airways clear of excess secretions and thereby reduce the incidence of inflammation and/or infection and is crucial to maintaining respiratory health. Airway clearance therapy using High Frequency Chest Wall Oscillation (HFCWO) has been demonstrated by clinical study to promote excess mucus clearance and improve bronchial drainage. Shear forces are created by HFCWO treatment that mechanically releases adhered secretions from the walls of the pulmonary tract. HFCWO has also been shown to reduce the viscosity of secretions which significantly improves mobilization of excess mucus. By replicating cough, HFCWO can effectively mobilize pulmonary secretions from smaller airways to larger airways where they can be coughed out, swallowed or suctioned.



## Symptoms of Bronchiectasis

- Persistent productive cough
- Production of large quantities of purulent (infected) sputum
- Chronic respiratory infection (including infection with rare and/or opportunistic organisms)
- Shortness of breath
- Cyanosis
- Digital Clubbing
- Hemoptysis (blood in sputum)

## For More Information on Bronchiectasis:

1. American Lung Association Bronchiectasis Fact Sheet:

[http://www.lungusa.org/site/c.dvLUK9O0E/b.35009/k.80DC/Bronchiectasis\\_Fact\\_Sheet.htm](http://www.lungusa.org/site/c.dvLUK9O0E/b.35009/k.80DC/Bronchiectasis_Fact_Sheet.htm)

2. National Jewish Medical and Research Center information on bronchiectasis:

<http://www.nationaljewish.org/disease-info/diseases/bronchiectasis/index.aspx>

3. National Heart, Lung and Blood Institute (NHLBI) Bronchiectasis Fact Sheet:

[http://www.nhlbi.nih.gov/health/dci/Diseases/brn/brn\\_all.html](http://www.nhlbi.nih.gov/health/dci/Diseases/brn/brn_all.html)

4. Emedicine peer-reviewed article on bronchiectasis (may require signing up for free membership): <http://www.emedicine.com/med/topic246.htm>