



Airway Clearance Indications: Obstructive Pulmonary Conditions

Chronic Obstructive Pulmonary Disease (COPD)

Chronic obstructive pulmonary disease (COPD) is a descriptive term most often applied to smoking-related emphysema and/or chronic bronchitis. While smoking is considered to be the major contributing factor in the development of COPD, certain environmental exposures and inherited risk factors have also been identified. COPD is the 4th leading cause of death in the United States. It is estimated that 11.6 million people in the United States have either chronic bronchitis, emphysema or both and recent studies suggest that COPD is significantly under-diagnosed with as many as 24 million people in the United States actually qualifying for the diagnosis. COPD affects people of all genders, races and ethnic backgrounds. COPD is generally considered an adult disorder with typical onset of symptoms in the 5th or 6th decade of life. However, COPD can appear at any age and has been reported in children and young adults with COPD-associated hereditary disorders like alpha-1 antitrypsin deficiency.

What Happens in COPD?

COPD-related chronic bronchitis differs from typical bouts of episodic bronchitis in both duration and severity. It is characterized by a chronic cough lasting more than 3 months and excessive mucus production. COPD-related chronic bronchitis is most often secondary to tobacco use. In COPD-related chronic bronchitis, the mucus-producing cells that line the airways hyper-secrete flooding the airways with excess mucus. Additionally, if chronic bronchitis is the consequence of smoking, the cilia (tiny, hair-like organelles that line the bronchial walls, whose function is to “sweep” debris-laden mucus out of the airways) are rendered ineffective because tobacco smoke damages or destroys them. The combination of excess mucus and damaged cilia overwhelms the mucociliary clearance system and leads to a build-up of mucus that narrows the airways and provides a perfect environment for the growth of infectious organisms. Over time a vicious cycle of inflammation, mucus hyper-secretion and infection sets in. Eventually the inflammatory state and obstruction of the airways in COPD-associated chronic bronchitis becomes permanent.

Emphysema refers to destruction of the little air sacs (alveoli) at the ends of the airways where gas exchange occurs. People with COPD may have either chronic bronchitis or emphysema or they may have both. If emphysema is present, loss of elasticity and collapse of small airways and alveoli further contribute to airway obstruction. Over time, the airways may become severely damaged, rendering the mucociliary clearance system totally ineffective.

How Airway Clearance Therapy Can Help COPD

There is currently no known cure for COPD. Therapy is targeted to maintaining a quality of life and function 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 COPD

- Increased breathlessness
- Wheezing
- Chest tightness
- Confusion
- Increased cough, and excessive mucus when you cough
- A change in the color of your mucus
- Fever
- Excessive sleepiness
- Blue lips or fingernails

For More Information on COPD:

1. The American Lung Association COPD Fact Sheet:

<http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=35020>

2 National Heart, Lung and Blood Institute (NHBLI) COPD Fact Sheet:

http://www.nhlbi.nih.gov/health/dci/Diseases/Copd/Copd_WhatIs.html

3 National Jewish Medical and Research Center COPD Fact Sheet:

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

4. Johns Hopkins Medicine COPD Fact Sheet:

http://www.johnshopkinshealthalerts.com/symptoms_remedies/copd/98-1.html

5. COPD and Airway Clearance Vest Study Site:

<http://clinicaltrials.gov/ct2/show/NCT00181207?term=copd+and+airway+clearance&rank=2>