

# **Airway Clearance Techniques**

**Chest Physical Therapy**

**Active Cycle of Breathing Technique**

**Autogenic Drainage**

**Positive Expiratory Pressure**

**High Frequency Chest Wall Oscillation**

**Exercise**

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## **Chest Physical Therapy**

Chest Physical Therapy (CPT) has been referred to as the “gold standard “ of airway clearance. In the advent of other options of airway clearance, it has been the treatment to which all others are compared.

CPT is an airway clearance that involves loosening the secretions through manual percussion and vibration of the chest wall in various postural drainage positions. The patient is placed in particular positions allowing for gravity to facilitate drainage of secretions from the lung. CPT is a labor-intensive form of therapy requiring a trained caregiver to perform.

## **Active Cycle of Breathing Technique**

The Active Cycle of Breathing Technique (ACBT), originally called the Forced Expiratory Technique (FET), was renamed and modified in order to emphasize all of its' components. The ACBT is a combination of breathing control, thoracic expansion exercises, and the forced expiratory technique. This combination is performed in a cycle, which is repeated until the huff is clear and dry. Gravity-assisted positions may be more effective. Percussion and vibration can be applied, if desired, with or without assistance.

**The Forced Expiratory Technique**, popularly known as the “huff”, is a forced exhalation through an open mouth and glottis. Properly performed, this technique maximizes airflow and minimizes airway collapse. Huffing prior to coughing will optimize airway clearance by moving secretions further up the airway. **The Forced Expiratory Technique is recommended with all of the Airway Clearance Techniques.**

The ACBT uses the concept of the **Equal Pressure Point (EPP)** theory. The EPP is the point at which the pressure inside the airway is equal to the pressure outside of the airway. At this point compression occurs, and it facilitates the movement of mucus.

## **Autogenic Drainage**

Autogenic Drainage (AD) is a technique designed to mobilize secretions by breathing control rather than postural drainage. The goal of therapy is to reach the highest possible airflow in different generations of bronchi. This is achieved by breathing at three different levels and adjusting expiratory flow rates to avoid airway collapse.

AD demands intense concentration and self-discipline. It is therefore recommended for the highly motivated person, at least 12 years of age.

## **Positive Expiratory Pressure Therapy**

Positive Expiratory Pressure (PEP) is achieved by exhaling against a mouthpiece or a mask attached to a fixed orifice in order to create a resistance to flow. During therapy the patient exhales against this resistance which prolongs the expiratory time and maintains airway stability. PEP therapy improves aeration by allowing inspired air to reach beyond obstructions through collateral ventilation. More evenly distributed air in the lungs promotes more effective airway clearance.

## **Flutter ®**

The Flutter is another expiratory device that, *in addition to positive pressure*, creates vibrations of the airways as a result of oscillating airflow and pressure. These vibrations are thought to further aid in the loosening of mucus.

The Flutter has a unique design. It looks like a pipe, and inside is a steel ball that rests on a conical piece. The patient's expiratory flow lifts and rolls the ball up the cone, which allows flow through; however, the weight of the ball causes it to drop back down, interrupting flow. This process is continuous throughout the expiratory phase. The stop-and-go action is responsible for the high frequency oscillations.

## **acapella™**

The acapella device is described as a "new generation of vibratory PEP therapy". It is another expiratory device similar to the Flutter with the benefits of PEP therapy *and* vibrations, but is different since you can adjust the frequency and resistance simply by turning a dial. This unique feature makes it more user-friendly.

## **High Frequency Chest Wall Oscillations**

High Frequency Chest Wall Oscillations (HFCWO) utilizes a mechanical device called the Vest ® Airway Clearance System. This system is an air-pulse generator connected to an inflatable vest worn by the patient. The Vest oscillates the chest wall creating vibrations and air movement throughout the airways. This movement is described as "mini-coughs". This action helps to loosen and move secretions.

## **Exercise**

Exercise is good for any person, with or without an excessive airway clearance need. It can be especially beneficial to the patient with CF since exercise improves muscle strength, endurance, and overall fitness. It is highly recommended, but not as a substitute for an Airway Clearance Technique.

