



**National Jewish
Health®**



WHAT CAN I DO TO FEEL BETTER

Cheryl Torres RRT

DISCLAIMER:

- ❖ *Currently employed by Hill Rom, Electromed and Respirtech providing setup and instruct to patients on their airway clearance device.*
- ❖ *Monaghan, Hill Rom, Respirtech, ElectroMed Have provided materials used for this presentation.*

BRONCHIECTASIS



FOUNDATION FOR THERAPY

- ❖ Nontuberculous Mycobacteria (NTM)
- ❖ Cystic Fibrosis
- ❖ Asthma
- ❖ Any mucus producing respiratory diagnosis

INTRODUCTION TO AIRWAY CLEARANCE

Goals of Treatment:

- ❖ Improve clearance of pulmonary secretions
- ❖ Decrease obstruction of the airways
- ❖ Improve ventilation and gas exchange
- ❖ Improve Quality of life



WHY DO WE NEED AIRWAY CLEARANCE

Normal function

- Cilia move back and forth mobilizing mucus to the larger, central airways where it can be expectorated easier

Compromised function

- Impaired or ineffective function of the cilia
- Chronic Respiratory Infections
- Overproduction of thick, sticky mucus
- Ineffective cough

WHAT IS AIRWAY CLEARANCE ?

Non-invasive forms of therapy



Airway clearance is needed to help clear away mucus from the lungs to help prevent infections and to improve lung function.

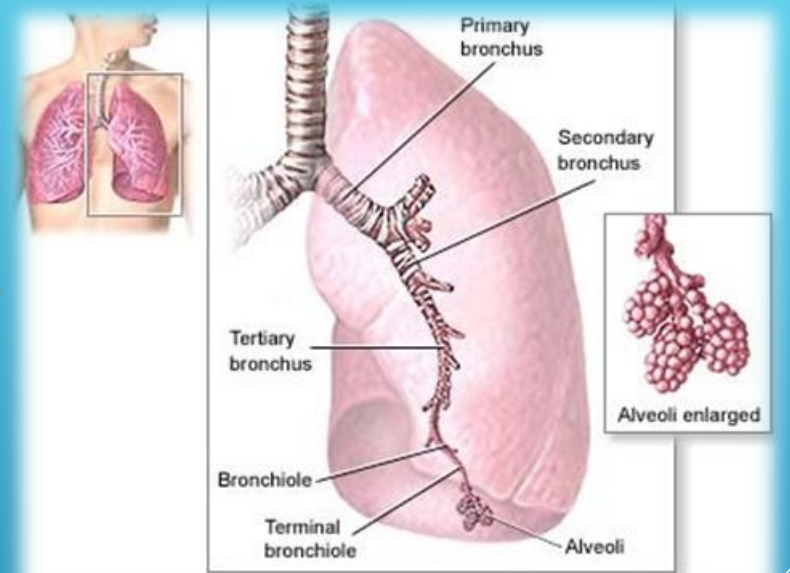
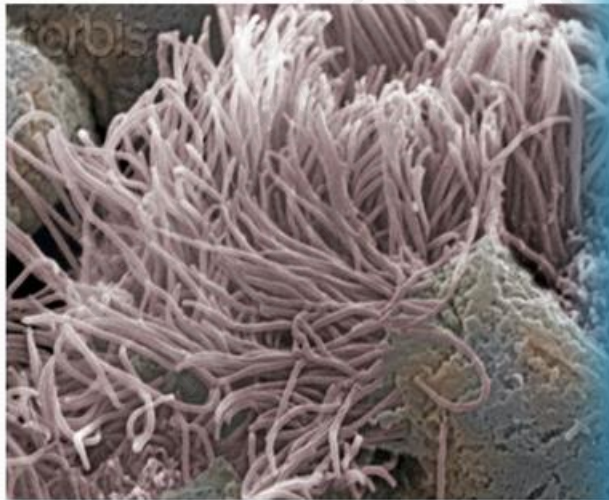
METHODS USED FOR AIRWAY CLEARANCE

- ❖ **Oscillating Positive Expiratory Pressure (OPEP)**
- ❖ **High Frequency Chest Wall Oscillation (HFCWO)**
- ❖ **Chest Physical Therapy (CPT)**
- ❖ **Postural Positioning (PD)**

MUCOCILIARY ESCALATOR

Cilia and Mucous

- **Cilia** are hair like projections used to capture bacteria and/or dust particles
- Cilia can be found in the linings of nasal passageway, trachea, bronchi, and bronchioles.
- **Mucous** is also located in these regions



Rusty Sputum (Prune-juice Sputum)

*Purulent sputum containing changed blood pigment is typical of **pneumococcal pneumonia** but it is frequently preceded by small amounts of frank blood.*

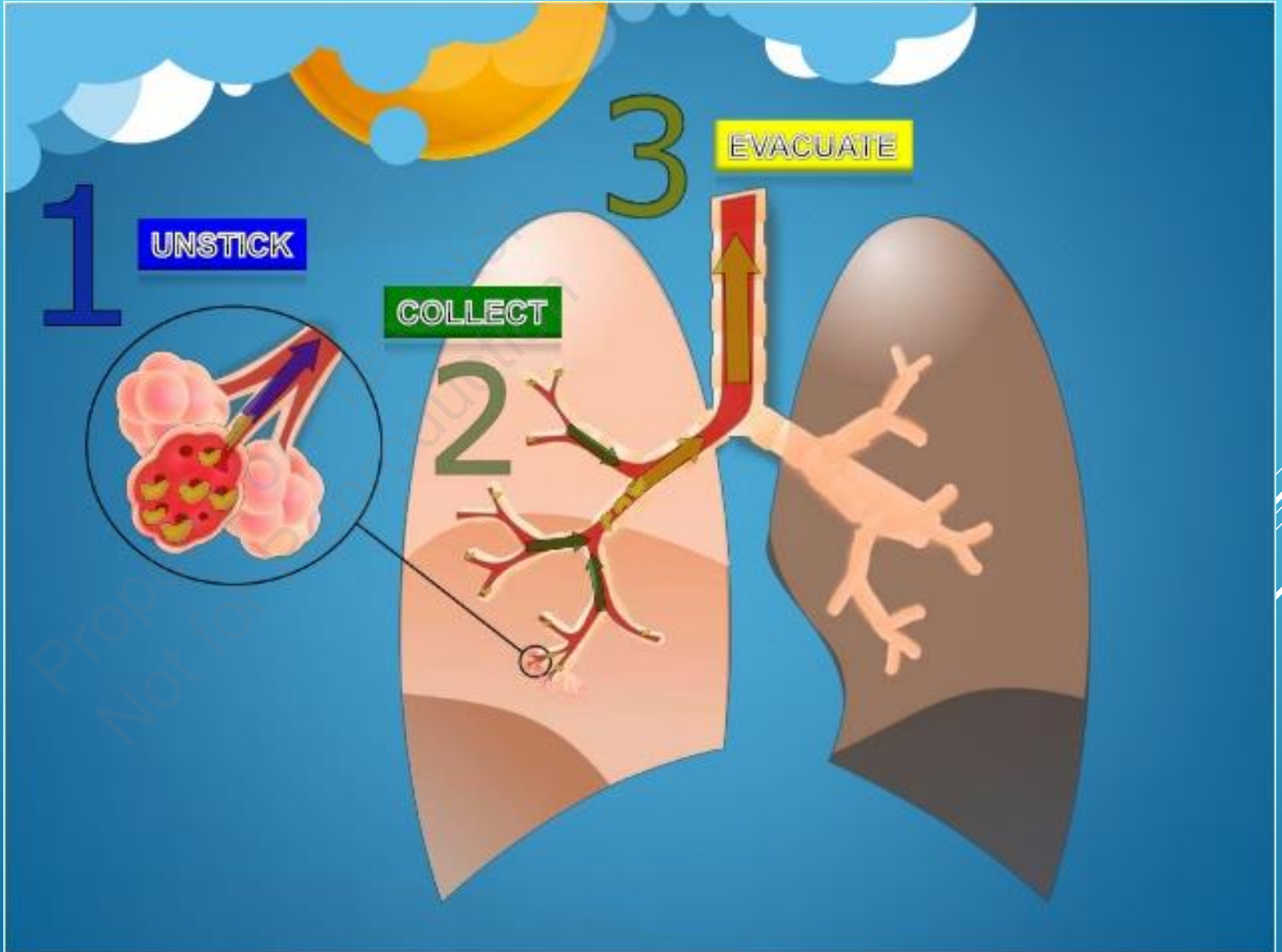
Stringy Mucoïd Sputum

*Increased mucous production and formation of mucous plugs occur in **asthma**; during resolution of an acute attack, retained mucous is mobilized.*

Frothy Sputum (Pulmonary Edema)

*Fluid from the pulmonary capillaries enters the alveoli and is expectorated. A thin secretion containing air bubbles, frequently colored with hemoglobin , is typical of pulmonary edema. Both **acute lung injury** and **left ventricular failure** produce this sign.*

Simple as
1 - 2 - 3





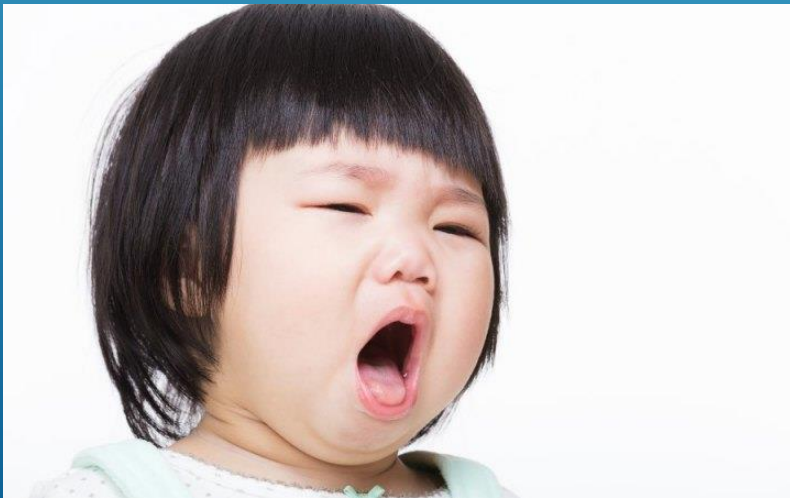
What Is The Huff
Cough?

Huff Cough

“Huff Cough” or **Force Expiration Technique (FET)**– is an alternative to deep coughing

Huff coughing involves taking a deeper breath than normal. Then use the diaphragm and stomach muscles to make a series of rapid exhalations, with the airway open, making a, “ha, ha, ha,” or “H” sound. This is then followed diaphragmatic breathing, and then a deep cough if mucus is felt moving within the larger airways or trachea.

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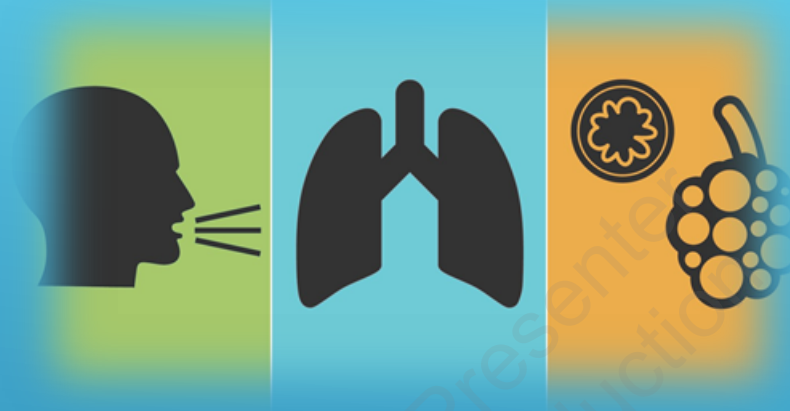


Oscillating Positive Expiratory Pressure (OPEP)



Aerobika

with Manometer



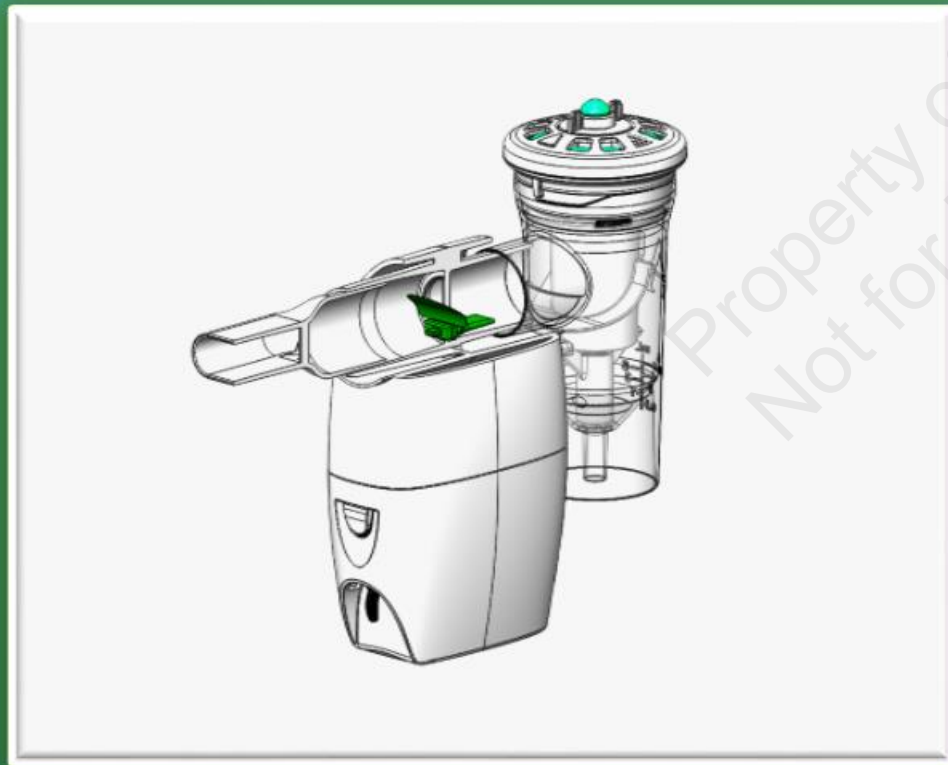
Acapella DH - Green

Acapella DM - Blue

- Powered by the patients exhaled breath
- Adjustable resistance for different medical diagnoses
- Can be used in line with a nebulizer
- Can be used in postural drainage positions

SECRETION MANAGEMENT WITH INHALED NEBULIZER

AeroEclipse XL (RBAN) can be used in line with AeroBiKA



- ❖ Hypertonic Saline
(3%, 7%, 10%)
- ❖ Normal Saline
(0.9%)
- ❖ Albuterol
- ❖ DuoNeb



AeroEclipse® XL Reusable Breath Actuated Nebulizer (R BAN)

- **Breath actuated technology nebulizer (Aerosolized medication is only produced when patient inhales through the device)**
- **Breath actuation and Continuous mode options**
- **No drug lost to environment**
- **Average treatment time is 6-8 minutes**
- **Durable, 6-month reusable nebulizer design. Single patient use**
- **Nebulizer designed for high level disinfection and dishwasher safe**
 - ✓ **Top shelf dishwasher cycle**
 - ✓ **High disinfection, Boil / 5 minutes**
- **Not made or manufactured with BPA, natural rubber latex, DEHP or lead**

CHEST PHYSIOTHERAPY



- ❖ Effective in patients who can tolerate postural positioning
- ❖ Can be used with manual hand percussion, G5 Percussor or OPEP device



HIGH FREQUENCY CHEST WALL OSCILLATION

Objectives

- **Overview of Airway Physiology/HFO device interactions that enhance secretion clearance:**
- Equal Pressure Point
- Dynamic airway compression with flow limitation
- Clinical uses of positive airway pressure
- Oscillatory Clearance Index



- ❖ Buckle closure
- ❖ Comes in full vest, chest vest and wrap
- ❖ Machine powered
- ❖ Dual Hose



the *inCourage*[™] system



- ❖ Machine Powered
- ❖ Dual Hose
- ❖ Buckle Closure
- ❖ Full vest, Chest Vest and Wrap



SmartWest[®]

AIRWAY CLEARANCE SYSTEM

— BY ELECTROMED, INC. —



- ❖ Machine Powered
- ❖ Single Hose
- ❖ Velcro Closure
- ❖ Comes in full vest and wrap

MONARCH PORTABLE VEST



AFFLO PORTABLE VEST



Battery Pack allows for **freedom of movement during treatments**



Average weight is 8 lbs



3 treatment settings
x 3 intensity levels
9 setting variations



Quiet during operation



7 sizes available

BENEFITS PULMONARY HYGIENE

- ❖ Enhances mucus mobilization and removal
- ❖ Decrease recurrent lung infections
- ❖ Decrease Antibiotic use
- ❖ Decrease Hospitalization
- ❖ Noticeable decrease in cough
- ❖ Improve gas exchange
- ❖ **Improves Quality of Life**



REFERENCES

- ❖ Braverman, JM. Airway clearance indications: an overview. *Advanced Respiratory* (1998-2001) 800-426-4224
- ❖ Irwin RS, Boulet LP, Cloutier MM, Gold PM, Ing AJ, O'Byrne P, Prakash UBS, Pratter MR, Rubin BK, Managing Cough as a Defense Mechanism and as a Symptom: A Consensus Panel Report of the American College of Chest Physicians. *Chest* 1998;114(2):133S-181S
- ❖ Cystic Fibrosis Foundation