Using The Power Of Acoustics To Provide Effective, Yet Gentle Airway Clearance Therapy

Proven Effectiveness

- The Frequencer® induced airway clearance in patients with cystic fibrosis equivalent to that of traditional CPT
- Results of testing showing significant increases in mucus flow rates using the Frequencer® as a component of CPT
- High degree of patient satisfaction with the Frequencer® versus traditional CPT

Gentle Application

- The Frequencer® uses considerably lower forces (1.9N) than applied during traditional CPT (58N)
- As a result, it’s a useful treatment option for patients already weakened by their condition
- The Frequencer® can safely be one of the preferred or primary choices by the patient and respiratory therapists
What does the Frequencer® offer Respiratory Therapists?

Easy Set Up
- Can be used throughout the hospital (ICU, adult, pediatrics, nursery…)
- No need to fit or move patient for treatment
- Ideal when faced with special patient conditions (obese, G-tube, trauma…)
- No calibration required
- Treatment on one side only (front or back)

Efficient
- No limit to the number of treatments per day or per patient
- Assurance of quality treatment every time and for entire treatment duration
- Four sizes of adapters to optimize treatment on patients of all ages
- Smallest 1” adapter ideal for pediatric care

Safe
- No concern of repetitive injury to caregiver (shoulder, elbow, wrist…)
- Reduced risk of cross infection with the use of disposable adapters/filters
- Possible to treat certain areas more often and for longer periods without negatively impacting patient care
Clinical Evidence

Comparison of the Frequencer® to other mechanical airway clearance methods.

<table>
<thead>
<tr>
<th>Airway clearance technique</th>
<th>Chest Physiotherapy</th>
<th>Other airway clearance devices</th>
<th>Frequencer®</th>
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<tr>
<td>Probable mechanism</td>
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<tr>
<td>Gravity causes mucus to flow</td>
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<td>x (if done in reclining positions)</td>
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<td>Opening of airways by increasing expiratory pressure</td>
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<td>Shock waves travelling through the thorax cause mucus to loosen from airway walls</td>
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<td>Resonant flexure exciting the primary thoracic resonance in the upper airways</td>
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<td>Targeting of individual areas of the lungs</td>
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<tr>
<td>Resonant flexure that occurs locally, rather than exciting only the primary thoracic resonance</td>
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<td>Modification of mucus rheology with mechanical oscillation</td>
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<td>Peristaltic flow in tubes due to longitudinal waves.</td>
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<td>Classical acoustical streaming in a boundary layer.</td>
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<tr>
<td>Acoustical streaming in a boundary layer adjacent to a mechanically vibrating surface</td>
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<td>Acoustical streaming from acoustical waves acting on the fluid surface</td>
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<td>Mixing of viscous fluids by waves in conditions that promote streaming</td>
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<td>Faraday instability that causes surface waves of Maxwellian fluids</td>
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<td>Beneficial coupling</td>
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</table>

The Frequencer® induced airway clearance in patients with CF that was equivalent to that of traditional CPT

Mechanical airway clearance using the Frequencer® electro-acoustical transducer in cystic fibrosis (Clin Invest Med 2006; 29 (3): 159–165.)

André M. Cantin, Marc Bacon, Yves Berthiaume
High degree of patient satisfaction with the Frequencer® versus traditional CPT

Using a Baylor University standardised questionnaire, patients assess their currently used clearance technique versus the Frequencer® over a 2-week trial period.

Results of Patient Satisfaction Survey

Comparison of Simplicity, Effectiveness, Convenience, and Satisfaction between Previous CPT and Frequencer® CPT.
The Frequencer® provides airway clearance therapy and promotes bronchial drainage by inducing vibration in the chest walls. It is intended for patients having respiratory ailments which involve defective mucociliary clearance.

- Cystic Fibrosis
- Chronic Bronchitis
- COPD
- Bronchiectasis
- Ciliary Dyskinesia Syndromes
- Asthma
- Muscular Dystrophy
- Neuromuscular Degenerative Disorder
- Post-operative Atelectasis
- Thoracic Wall Defects

*https://www.accessdata.fda.gov/cdrh_docs/pdf10/K100749.pdf

The Frequencer® provides a gentler, less painful form of therapy from the traditional “clapping” method of postural drainage therapy, allowing it to be used on patients who cannot be treated by clapping.
Tests with the Frequencer® were performed with patients in a sitting or slightly reclined position. Use of the Frequencer® is contraindicated in the following cases:

- Subcutaneous emphysema
- Recent epidural spinal infusion or spinal anesthesia
- Recent skin grafts, or flaps, on the thorax
- Burns, open wounds, and skin infections of the thorax
- Subcutaneous pacemaker
- Tuberculosis of the lungs
- Lung contusion
- Bronchospasm
- Osteomyelitis of the ribs
- Coagulopathy
- Complaint of chest-wall pain

When postural drainage is used, postural drainage therapy is generally contraindicated if any of the following conditions are present:

Intracranial pressure (ICP) > 20 mm Hg, recent head and/or neck injury, acute spinal injury or active hemoptysis, esophageal surgery, recent spinal surgery (e.g., laminectomy) or acute spinal injury, recent neurosurgery, aneurysms, or eye surgery, surgical wound or healing tissue, active hemorrhage with hemodynamic instability, emphysema, bronchopleural fistula, pulmonary edema associated with congestive heart failure, large pleural effusions, pulmonary embolism, intolerance of position changes, rib fracture, with or without flail chest, uncontrolled hypertension, distended abdomen, recent gross hemoptysis related to recent lung carcinoma treated surgically or with radiation therapy, uncontrolled airway at risk for aspiration (tube feeding or recent meal).