All age groups  ☒ Adult  ☒ Geriatric
☒ Adolescent  ☒ Pediatric (4 years and older)  ☐ Neonate

Body Substance Exposure Risk

☒ Category I: Task involves exposure to blood, fluids, or tissue.
☒ Category II: Usual tasks do not involve exposure to blood, body fluid, or tissue, but job may require performing unplanned Category I tasks.
☐ Category III: Tasks involve no exposure to blood, body fluids, or tissues. Category I tasks are not a condition of employment.

Acapella™
(mucus clearance device)

Introduction:

The acapella® is a ready-to-use small hand-held device that combines the resistive features of the positive expiratory pressure of a PEP valve and the vibratory features of a flutter valve to mobilize secretions in the airway. A resistive pressure device works by using a pressurized breath to splint open the airway. Vibratory devices work by using oscillating vibrations that travel into the lungs, shaking free mucus plugs that the patient can cough up. With a pressurized breath and a vibratory effect, the acapella enables additional air to enter into the airways, get behind secretions, improve cough effectiveness and help push secretions out. The acapella, like PEP and flutter, is a better alternative to chest percussion and postural drainage because it requires far less therapist time, and can be utilized in patients unable to tolerate CPT & PD.

The acapella uses a counterweighted plug and magnet directs exhaled air through a pivoting cone, to generate airflow vibrations between 0-30 Hz. Both the vibration frequencies and the resistive pressures are adjustable (see diagram). The acapella removes many technique-dependent variables in this type of therapy. Patients as young as 4 years old, can be instructed for self care with acapella as part of an overall secretion management program.

Acapella easily allows for simultaneous administration of bronchodilators by attaching a nebulizer to the distal end. Aerosol drug delivery can be performed during therapy for secretion clearance and atelectasis.

Indications:

1. To aid in mobilizing retained secretions as observed in cystic fibrosis, chronic bronchitis, and pneumonia.
2. To prevent or reverse atelectasis.
3. To optimize delivery of Bronchodilator in patients receiving bronchial hygiene therapy.

Frequency:

Common strategy for acapella treatment frequency, for patients in the acute care setting, ranges from every 1 to 6 hours. Patient response to therapy determines adjustments.
Contraindications:
There are no absolute contraindications to the use of PEP, flutter, or acapella. However, carefully consider the decision to start therapy, if:

1. Patient tolerance of increased work of breathing (acute asthma, COPD).
2. Intracranial pressure (ICP) >20 mmHg.
3. Hemodynamic instability.
4. Recent facial, oral, or skull surgery or trauma.
5. Acute sinusitis.
7. Esophageal surgery.
8. Active Hemoptysis.
10. Known or suspected tympanic membrane rupture or other middle ear pathology.
11. Untreated pneumothorax.

Procedure:

1. Select device. (The Acapella is available in two color-coded models.)
   a. The green Acapella is for patients able to maintain an expiratory flow of 15 LPM or greater for 3 seconds. The green Acapella is suitable for most patients.
   b. The blue Acapella is for patients not capable of 15 LPM for 3 seconds.

2. Initial settings
   a. With the first use of acapella, ensure that the frequency adjustment dial is turned counter-clockwise to the lowest frequency-resistance setting (see diagram).
   b. Frequency/ resistance increase clockwise.
   c. Selecting the proper resistance range produces the desired I:E ratio of 1:3 to 1:4.

3. To provide simultaneous aerosol drug delivery, attach nebulizer to the end of the acapella (see diagram).

4. Place mouthpiece lightly in mouth; maintain a tight seal on the mouthpiece during inspiration. Use/apply nose clip if necessary. If using a mask, apply tightly but comfortably over nose and mouth.

5. Instruct the patient to relax while performing diaphragmatic breathing. Patient should inspire a volume of air greater than normal tidal volume, but less than total lung capacity. Instruct patient to slowly inhale to \( \frac{3}{4} \) maximum breathing capacity.

6. Instruct patient to hold breath for 2-3 seconds.

7. Direct the patient to exhale to functional residual capacity (FRC) actively, but not too forcefully, through the device.
8. Emphasize the importance of inhaling slowly, breath holding, and suppressing the urge to cough.

9. The patient should be able to exhale for 3 - 4 seconds while the device vibrates. If the patient cannot maintain an exhalation for this length of time, adjust the dial clockwise. Clockwise adjustment increases the resistance of the vibrating orifice, which will allow the patient to exhale at a lower flow-rate.

10. Perform 10 - 20 breaths. Remove mouthpiece and perform 2 - 3 “huff” coughs to raise secretions as needed.

11. Repeat steps 4 to 10 as prescribed.

12. Document procedure and relevant finds on the respiratory progress notes in the therapy section of the chart.

Cleaning:
As needed detach mouthpiece, soak the parts in warm soapy water, rinse and dry. Drain the device by placing the unit with the mouthpiece end downward, or by resting the unit on its side. Single patient use device; observe universal precautions as appropriate.

Assessment of Outcome:
1. Change in sputum production-- If PEP, Flutter, or Acapella do not increase sputum production in a patient who produces > 30 mL/day of sputum without PEP, Flutter, or Acapella, continued use may not be indicated.

2. Change in breath sounds-- with effective therapy, breath sounds may clear or the movement of secretions into the larger airways may cause an increase in adventitious breath sounds. The increase in adventitious breath sounds is often a marked improvement from diminished breath sounds.

3. Patient subjective response to therapy-- the therapist should ask the patient how he or she feels before, during, and after the therapy.

4. Change in vital signs-- moderate changes in respiratory rate and/or pulse rate are expected. Bradycardia, tachycardia, increasingly irregular pulse, or significant changes in blood pressure are indications to stop therapy.

5. Change in chest x-ray-- resolution or improvement of atelectasis and localized infiltrates may be slow or dramatic.

6. Change in arterial blood gas values or oxygen saturation-- normal oxygenation should return as atelectasis resolves.

Diagram: Acapella with medication nebulizer attached correctly.

References:

2. Use of Positive Airway Pressure Adjuncts to Bronchial Hygiene Therapy, AARC Clinical Practice Guideline.