

Evaluation of cough assist devices by the Swiss Society of Pulmonology (SIG Ventilation & O2)

Cough Assist Device: EOVE 70

Reviewer / institution: SSP-summary of evaluation by Matthias Peterer and team,
Respiratory Physiotherapists (USZ)

Device overview	
Company	EOVE
Cough Assist	EOVE-70
CE marking	Yes CE 0459
Product class	<input checked="" type="checkbox"/> Cough Assist <input checked="" type="checkbox"/> other: IPPB Therapy
Device specifications	
Weight, size	Weight: 3.4 kg Size/dimension: 300x140x105 mm Comment: smaller compared to other Cough Assists
Display	Touchscreen: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Size/dimension: attractive and user-friendly display, plus appealing paediatric mode background
Connections	<input checked="" type="checkbox"/> Power adapter <input checked="" type="checkbox"/> External battery <input checked="" type="checkbox"/> Oxygen inlet port <input checked="" type="checkbox"/> Outlet port (for tube) <input checked="" type="checkbox"/> Supplementary measurements/monitoring, e.g. SpO2 , CO ₂ , FiO ₂ , p _{oes}): <input type="checkbox"/> Remote control <input type="checkbox"/> Alarm/nurse tool: no Bluetooth connection <input type="checkbox"/> Other:
Electrical rating and system interface	AC (alternating current): 100-240 V DC (direct current): 12-30 V Accu level indicator: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Service	Company: VitalAire Home Healthcare Suppliers of disposable material: VitalAire Home Healthcare and others
Ventilation modes and settings	
Permitted age groups	Adults <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Children <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO (not tested in children by SGP) Comment: obviously suitable for both
Device modes	<input checked="" type="checkbox"/> Cough-Assist <input checked="" type="checkbox"/> IPPB Therapy <input type="checkbox"/> Other:
Profiles	Number: 3
Pressure and flow range	Mechanical in-/exsufflation (Cough-Assist)

	<p>Pressure Inspiration: 5-70 cmH2O Pressure Expiration: 0-70 cmH2O PEEP: 0-20 cmH2O Comment: different possible settings are well described in the manual</p> <p>IPPB-therapy Max.pressure: 10-50 cmH2O Flow: 5-100 l/min PEEP: 0-20 cmH2O</p>
Trigger	<p>Inspiratory trigger: <input checked="" type="checkbox"/> scale <input type="checkbox"/> absolute value - Type: <input checked="" type="checkbox"/> flow trigger <input type="checkbox"/> pressure trigger - Range: 1-5 cmH2O - Clarity of the scale: <input type="checkbox"/> arbitrary <input checked="" type="checkbox"/> clear/distinct Comment: The sensitivity of the trigger is highly dependent on the leakage valve used. There is no clear recommendation for a specific leak valve. In tests with a Resmed leak valve - ROW (24988), the trigger proved to be very insensitive, while with a leak valve sent by the provider (Leckport BREAS), there was a higher, but still unsatisfactory sensitivity.</p>
Pressure rise	<p>Type: <input checked="" type="checkbox"/> scale <input checked="" type="checkbox"/> time Range: 0-5 sec. Clarity of the scale: <input type="checkbox"/> arbitrary <input checked="" type="checkbox"/> clear/distinct</p>
Inspiratory and expiratory time	<p>Mechanical in-/exsufflation (Cough-Assist) T insp. 0.5-5 sec T exp. 0.5-5 sec</p> <p>IPPB-therapy T insp. (maximum) 0.5-20 sec T exp. (rise time) 0-5 sec</p>
Oxygen	<p>Direct O2 connection on the device: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p>
Extras	<p>Possibility of a pedal control</p>
Safety	<p>Expert area enabling: Battery capacity shown <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO If yes: scale: hours & % Warning if power switched to battery <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p>
Additions	
Relevant accessories	<p>Pedestal/Carrier <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO External battery <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO SpO2 sensor <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Other: Leake valve <input checked="" type="checkbox"/> NO</p>
Software	
Connections / network	<p><input type="checkbox"/> USB <input checked="" type="checkbox"/> SD Card, memory size: <input type="checkbox"/> Other:</p>
Software / statistics	<p>Comment: not tested</p>
Handbook	
Manual	<p>Practicability: given Completeness: given</p>
Validation studies	

Validation studies	Not available
Report on application in patients	
Real-life application	<p><u>Mechanical in-/exsufflation (Cough-Assist):</u> The device showed comparable functionality to other cough assist devices in the insufflation-exsufflation function. Mucus mobilisation worked as well as with other devices. In contrast to the IPPB mode, there were no problems with the trigger. The success of the therapy depends on parameters that cannot be influenced by the device, such as mucus condition, airway condition and patient cognition. The best results were achieved when the device was used via a tracheal tube. The patients tolerated the therapy well.</p> <p><u>IPPB-therapy:</u> IPPB therapy was initially performed with a leak valve from ResMed (24991 leak valve). As the patients could not subsequently perform the therapy without interruptions, the provider was asked to supply a leak valve (leak port from BREAS) to avoid bias in the evaluation. The following reports were thus conducted with the leak port from BREAS. Only patients with good cognitive function and only mildly impaired inspiratory muscles strength and lungs were able to use IPPB therapy at a satisfactory intensity after practising and readjusting the settings several times. In all other trials with patients, some of whom had severe ventilatory disorders or strongly impaired respiratory muscle function, the trigger proved not to be sensitive enough, resulting in many frustrating therapy discontinuations. Even with a leak valve supplied by the manufacturer (leak port BREAS), the problems with the trigger were evident regardless of patient status. Switching from a face mask to a mouthpiece showed improvement in the least affected patients. In one case, IPPB therapy was attempted via a tracheal tube. The device did not show desirable pressure support for lung recruitment due to the patient's inadequate use and thus could not lead to successful lung recruitment. Regardless of the leak valve used, IPPB therapy via the tracheal tube often had to be retriggered manually due to the low sensitivity of the trigger.</p>

Patient report	
Pros / advantages	<p><u>Cough Assist:</u> Efficient set-up and good comfort and functionality.</p> <p><u>IPPB:</u> A younger patient with mild impairment of respiratory muscle function who used IPPB therapy via a face mask without a leak valve because of atelectasis experienced a relatively strenuous therapy that felt good to recruit lung volume and it was possible to perform IPPB over five cycles with up to twenty repetitions without any side effects. In this case, the EOVE 70 proved to be a very good tool for partial atelectasis therapy.</p> <p>A second young patient using IPPB therapy with a Resmed leak valve reported great difficulty in triggering the therapy. In the breaths where she could trigger properly, the therapy felt good to recruit lung volumes. After switching to the BREAS leak valve and 3 therapy sessions including adjustments to settings, she was able to deliver IPPB therapy without interruptions. Nevertheless, she reported that she achieved adequate recruitment only on every second inspiration.</p>

Cons / drawbacks	<p>An elderly patient with severely affected lungs and weak respiratory muscles was unable to initiate therapy via a face mask. Various settings showed no success.</p> <p>The patient with the tracheal tube was not able to give feedback. In terms of the parameters measured by the device itself and the monitoring monitor, he was not able to use IPPB therapy efficiently to recruit lung volume. In addition, the therapy had to be triggered manually for the most part. Vital capacity could not be increased during therapy. These difficulties were not dependent on the leak valve used.</p>
-------------------------	--

Summary	
Pros / advantages	<p>The EOVE device proved itself as valuable tool due to its combined possibilities of MI-E and IPPB in one device.</p> <p>Very elegant, safe and efficient adjustable function, adaptable to the patient, which fulfils the purpose and is well tolerated by the patients. Settings are quicker and better visualised compared to other cough assists.</p> <p>PEEP as an advantage compared to other devices.</p>
Cons / drawbacks	<p>There is no negative aspects or limitations in the in- and exsufflation function.</p> <p>The IPPB therapy option in the same device offers the possibility to do both, mobilising secretions and recruiting the lungs. However, application of IPPB was found very difficult even in patients with only mild impairment in respiratory function. The trigger was too insensitive. A leak valve such as that of BREAS and the use of a mouthpiece are prerequisites for the application of IPPB therapy.</p>
Recommended setting and patient groups	<p><u>Cough support:</u> Settings must be chosen at the level at which cough support is most effective. Basic recommendations for settings and patient group are well discussed in the literature. There are no additional comments on the INEX function of the EOVE.</p> <p><u>IPPB:</u> For settings and application, it is recommended to use the leak port of BREAS or a leak valve that does not have a larger opening than that of BREAS. Adjustments must be made by an experienced therapist to increase the possibility of uninterrupted therapy. Due to the low sensitivity of the trigger, the patient group selected for IPPB should not be too heavily impaired in their respiratory function.</p>

Recommendation of the SIG ventilation & O2 of the Swiss Society of Pulmonology

Based on the above evaluation, we recommend the availability of this device on the Swiss market.

13.09.2022

PD Dr. med. Esther I Schwarz



On behalf of the SIG Ventilation and O2