

# pNeutron A

## Pneumatic Transport Ventilation

### Integrated CPAP with Low Work of Breathing

The pNeutron A Ventilator has an integrated PEEP / CPAP system with these clinical advantages:

- One easy to operate calibrated control, 0 – 20 cmH<sub>2</sub>O
- No additional valves in the patient circuit are required
- Trigger sensitivity automatically adjusts as you change the CPAP level
- Provides extremely low imposed work of breathing
- Noninvasive face masks or invasive endotracheal tube applications
- Delivers your choice of 100% or 65% oxygen

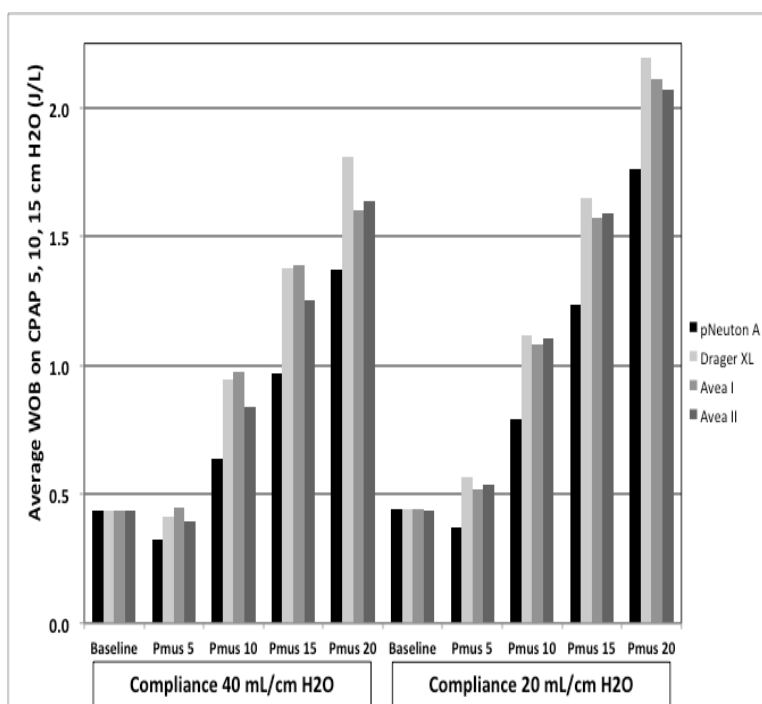
The key performance feature for a CPAP system measures how well it functions to meet patient demand. The additional patient effort to breathe through the circuit/ventilator system is known as *imposed work of breathing* (WOB). The higher the WOB, the more difficult it is for the patient to breathe spontaneously.

Traditional transport ventilators have very high WOB limiting spontaneous breathing. Their designs use high resistance demand valves or simple continuous flow systems, which require more patient effort. In addition, these ventilators do not provide a choice between 65% and 100% oxygen for the spontaneous breaths, their spontaneous breaths are delivered at 100%. pNeutron is quite different.

In fact, pNeutron's WOB is comparable to many of today's large, expensive critical care ventilators. In laboratory testing researchers at the University of California, San Francisco found the pNeutron had the lowest WOB compared to **Drager Evita XL** and **Carefusion Avea**

ventilators\*. Using an advanced lung simulator they showed that as patient breathing efforts increased, the pNeutron was able to maintain CPAP better than the ventilators. The chart to the right shows as patient effort increases (Pmus) each ventilator requires more effort to breathe. Under all conditions the pNeutron requires the least effort.

Critical care research reports that lower WOB during CPAP results in better respiratory support and greater comfort for the patient. The pNeutron is the best choice to provide CPAP during all transport situations.



\* Siobal M, Phillips J. Work of Breathing During CPAP: Comparison of Continuous Flow and Demand Flow Ventilators. *Resp Care*. 2014;59:OF60



# UCSF SAN FRANCISCO GENERAL HOSPITAL

## WORK OF BREATHING DURING CPAP: COMPARISON OF CONTINUOUS FLOW AND DEMAND FLOW VENTILATORS

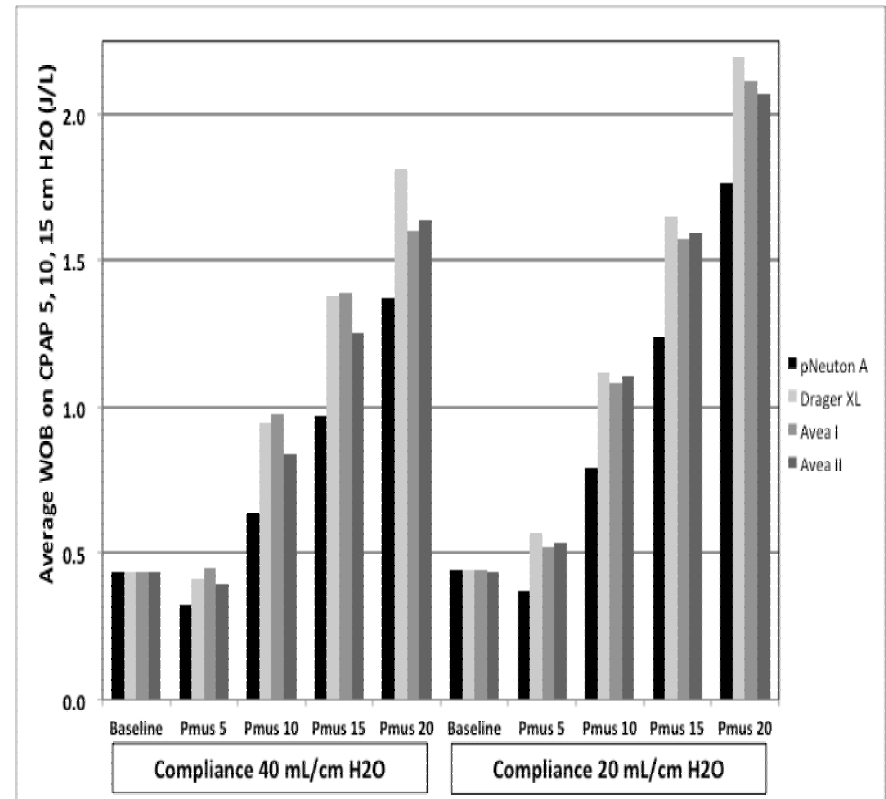
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**Background:** Work of breathing (WOB) on a ventilator is dependent on inspiratory and expiratory valve performance, and patient muscle effort. We compared WOB on varying levels of CPAP during breathing simulation at different inspiratory efforts (Pmus) and lung compliance settings. Testing was performed on the pNeuton A ventilator continuous flow CPAP and the Drager XL, Avea (Avea I), and upgraded Avea (Avea II) ventilators with demand flow CPAP.

**Method:** An ASL 5000 advance breathing simulator was used set to a frequency of 30/min, sinusoidal breath configuration, rise time 20%, inspiratory hold 0%, release time 30%, resistance 5 cm H2O/L/sec, compliance 40 and 20 mL/cm H2O, and Pmus of 5, 10, 15, and 20 cm H2O. Baseline measurements were recorded with a Pmus setting of 5 cm H2O with no ventilator connected. Ventilators were tested at CPAP settings of 5, 10, and 15 cm H2O at each compliance and Pmus setting. Inspiratory and expiratory WOB, and total WOB in Joules/Liter (J/L) were recorded and calculated at each test setting by the ASL 5000. The total WOB at all CPAP levels was averaged for each ventilator.

**Results:** Total WOB increased on each ventilator as Pmus increased and lung compliance decreased. WOB was lowest on the pNeuton A ventilator during all test conditions. WOB was highest on the Drager XL at all Pmus settings with a lung compliance of 20 mL/cm H2O.

**Conclusion:** This data confirms that WOB is lower on continuous flow CPAP versus demand flow CPAP systems.



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