Methods

Detection of Breath Timing and Calculation of Respiratory Parameters

The airflow signal was sampled at 125 Hz and filtered using a second-order Savitzky-Golay (S-G) filter of 0.5s.\textsuperscript{1,2} The S-G filter was designed to perform as a bandpass filter with the cut-off frequency of 2 Hz.\textsuperscript{3} An amplitude threshold algorithm was then applied to detect respiratory cycles.\textsuperscript{4} This algorithm identifies zero-crossing points, peak inspiratory and peak expiratory points of the respiratory signal, and then applies an amplitude threshold to reject false breath-detection. Figure E1 illustrates the detection of breath timing.

For each 60-second window before and following the onset of a reduction in continuous positive airway pressure (CPAP), we calculated the following parameters on a breath-by-breath basis:

- Pmask: nadir Pmask during inspiration.
- Peak inspiratory flow (PIF): peak inspiratory airflow.
- Minute ventilation ($\dot{V}_E$): generated by integrating the flow signal. $\dot{V}_E$ is then calculated as tidal volume multiplied by respiratory rate.
- Pepi: nadir Pepi during inspiration (corrected for baseline drift).

These parameters were then averaged within each condition (on CPAP and during transient reductions) for each participant.
Figure S1. Breath detection and calculation of pressure and respiratory parameters. Pmask is mask pressure, Pepi is epiglottic pressure and Flow is airflow. Dashed line represents the onset of a reduction in continuous positive airway pressure (CPAP). Green and red asterisks represent the onsets of inspiration and expiration, respectively. Black dots represent Peak Inspiratory Flow (PIF).
References


