

Adaptive support ventilation

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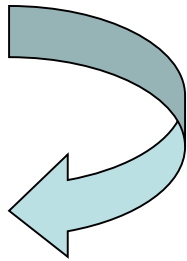
Adaptive support ventilation

Galileo, Hamilton

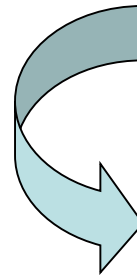
Adaptive Support Ventilation

Εναλλασσόμενο mode

Δεν αναπνέει



(ασθενής)
(Sensor)



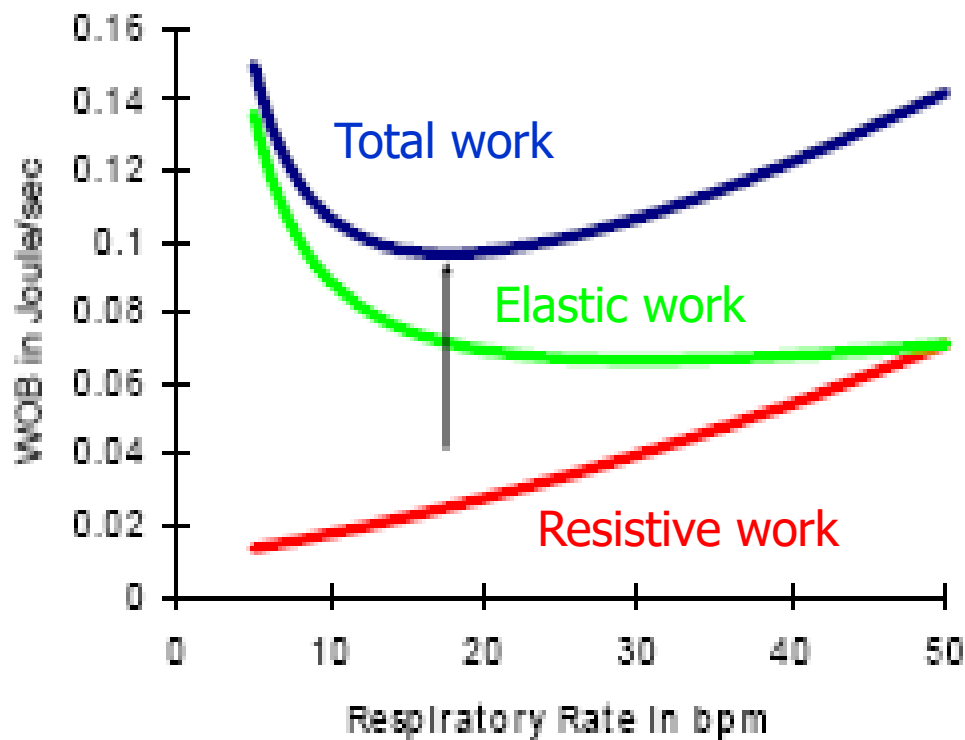
Αναπνέει

Mandatory pressure-
control mode

(αναπνευστήρας)

Pressure Support

Calculate Optimal Breath Pattern: Minimal WOB



MV=Minute ventilation
VD=dead space

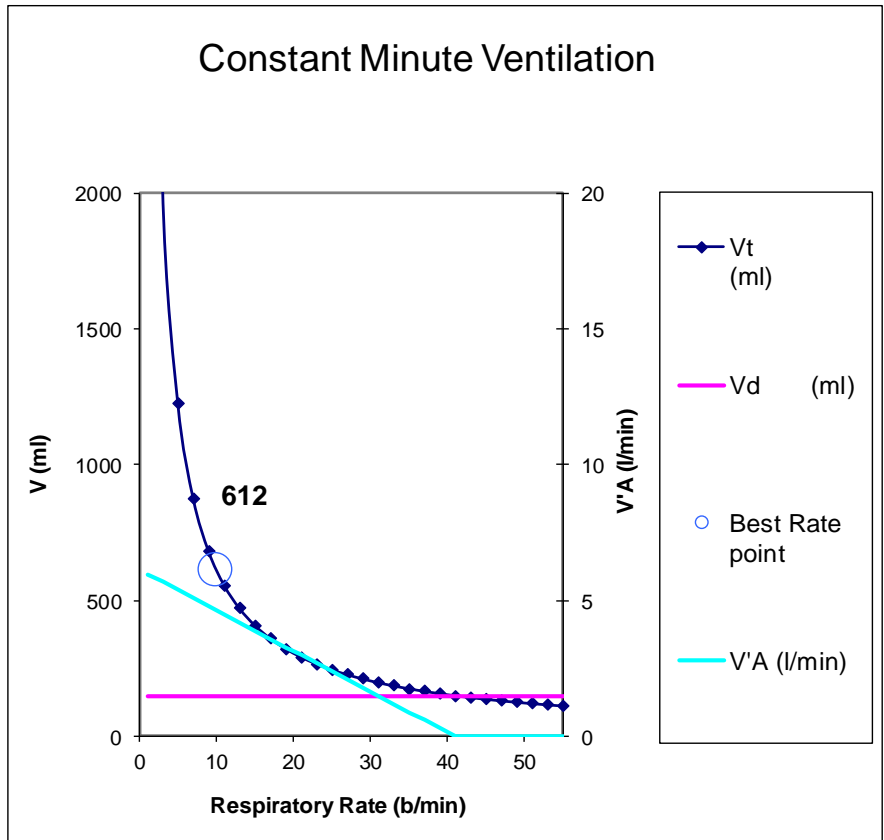
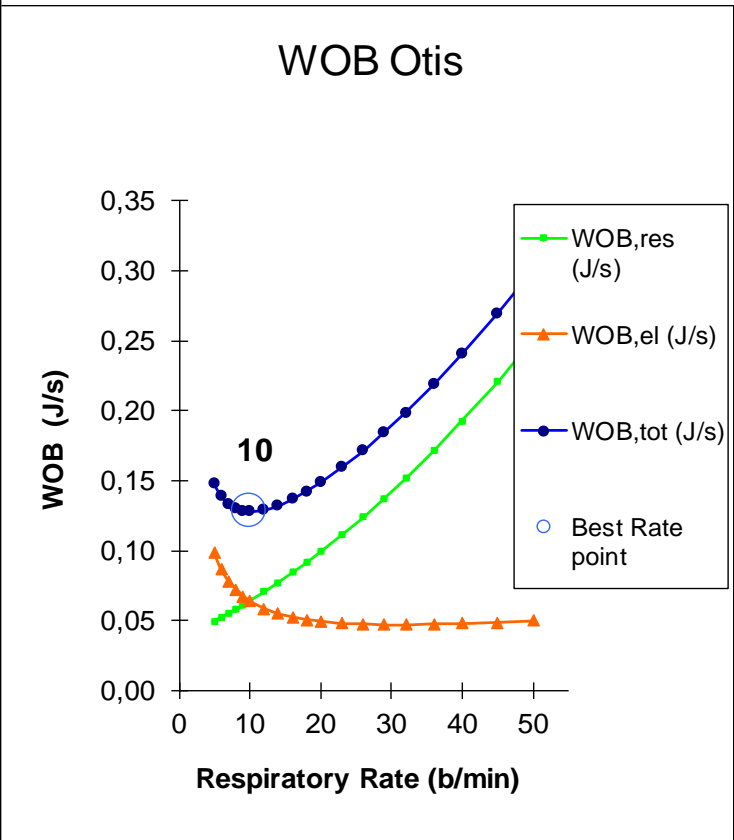
$$f\text{-target} = \frac{\sqrt{4a^*R\text{Ce}^*(MV-V\text{D})/V\text{D} - 1}}{a^*R\text{Ce}}$$

| | | | | | | |
|------------|--------------|-----------|-------------|-----------|-----------|------------------|
| Raw | 20 | cmH2O/l/s | Rext | 5 | cmH2O/l/s | Auto-Otis |
| Crs | 49 | ml/cmH2O | Rtot | 25 | cmH2O/l/s | |
| RC | 1,225 | s | | | | |

| | | | |
|---|----------------|------------|-------|
| <input type="radio"/> Free | V'e | 6,1 | l/min |
| <input checked="" type="radio"/> Linked | IBW | 68 | Kg |
| | %MinVol | 90 | % |

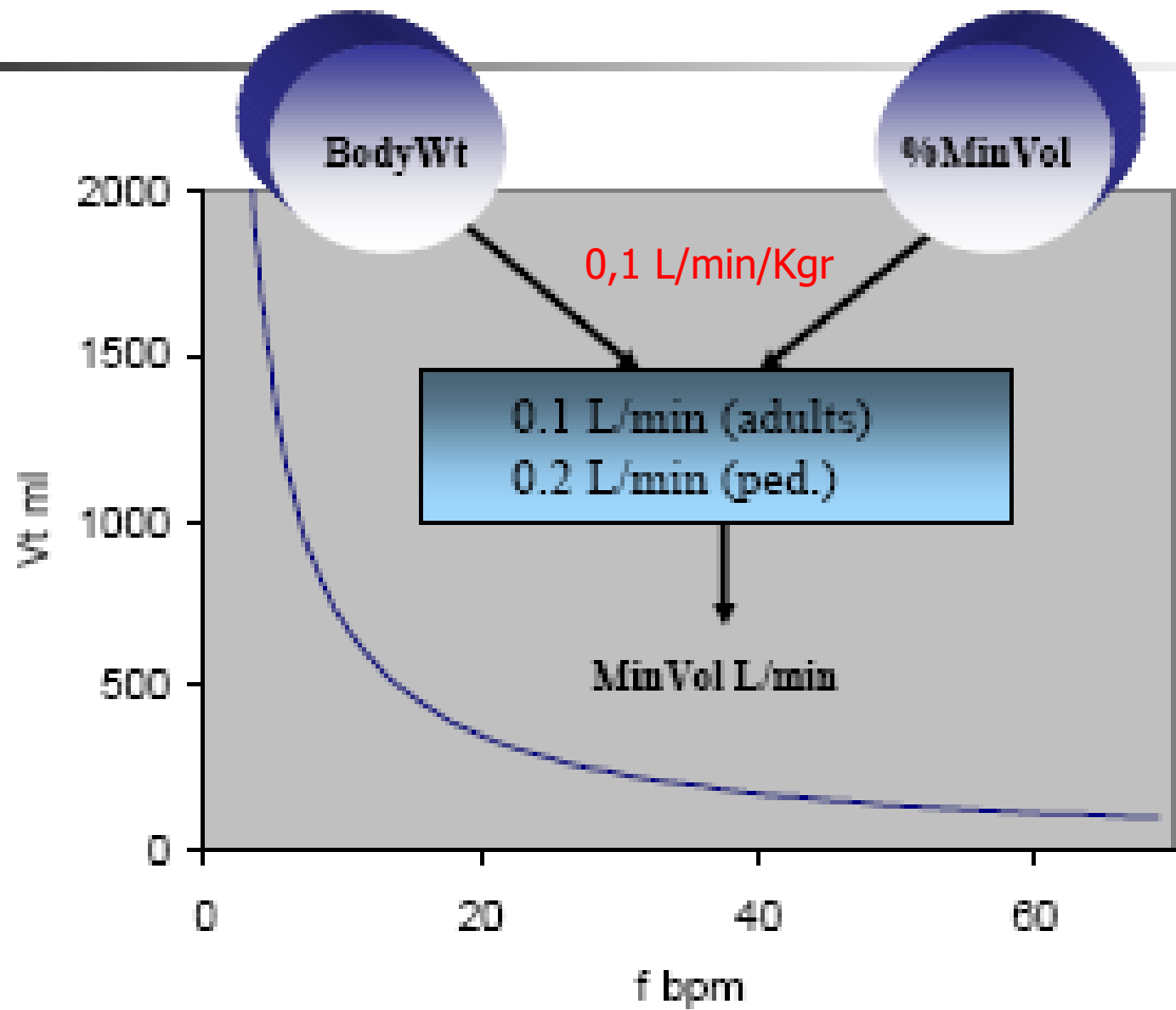
| | | |
|------------|--------------|-------|
| Vd | 149,6 | ml |
| V'd | 1,5 | l/min |
| V'A | 4,6 | l/min |

| | | |
|------------------|------------|-------|
| Best Vt | 612 | ml |
| Best Rate | 10 | b/min |

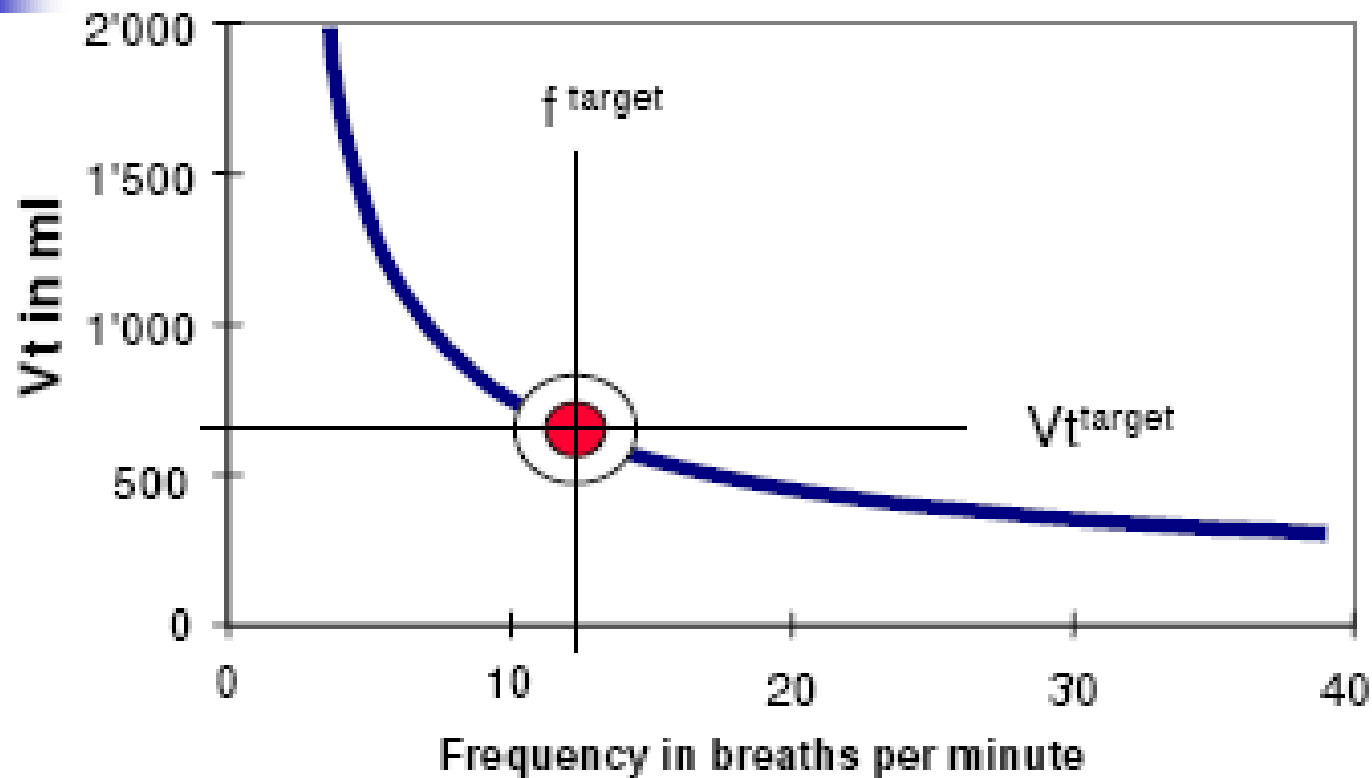


Adaptive support ventilation

- Clinician enters patient data & % support
- Ventilator calculates needed minute volume & best rate/Tidal Volume to produce *least work*.
- Targeted Tidal Volume given as pressure control or pressure support breaths
 - ◆ Breath is:
 - ◆ PC if time triggered
 - ◆ PS if patient triggered



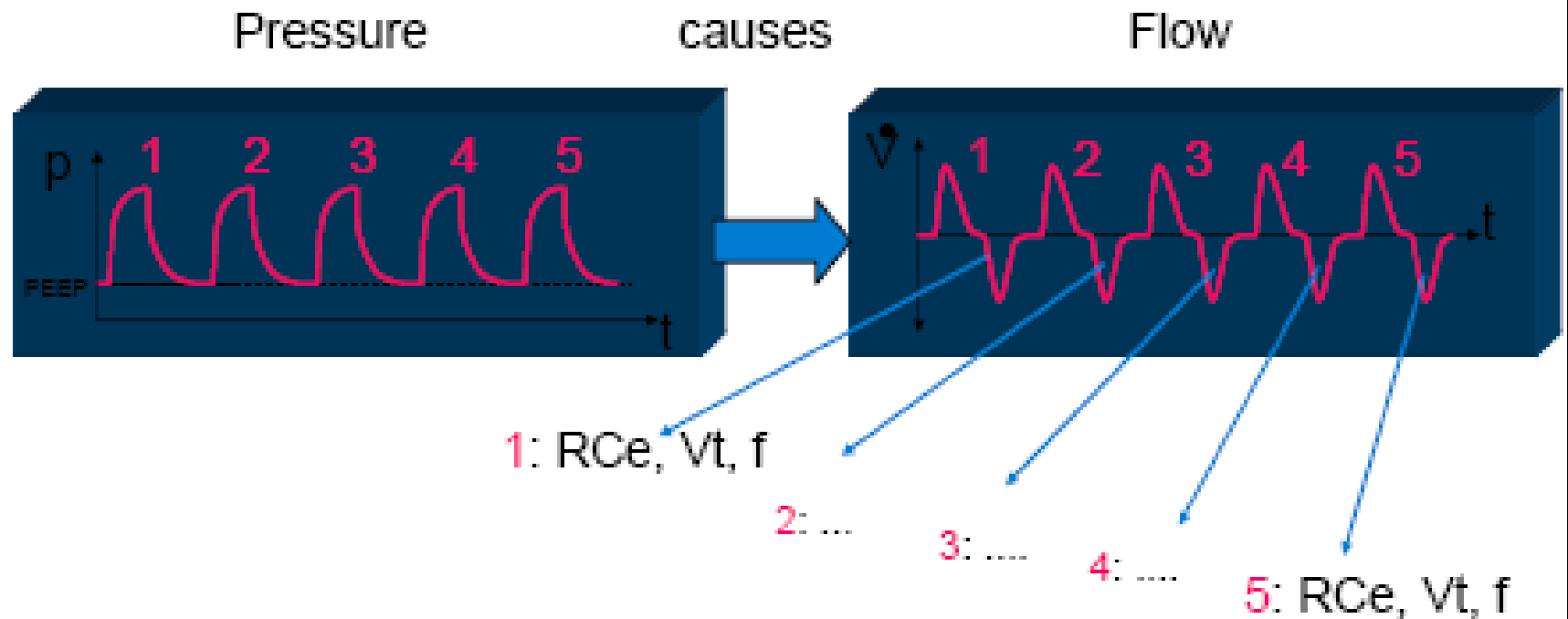
Calculate Optimal Breath Pattern: Calculate V_T



Adaptive support ventilation

- Ventilator measures & analyzes data & mechanics each breath for:
 - ◆ compliance
 - ◆ resistance
 - ◆ inspiratory & expiratory time constants
 - ◆ actual I-time, E-time, total f & minute volume
 - ◆ pressures
- Pressure adjusts in +/- 2 cm H₂O to achieve Tidal Volume

Assess patient: Five test breaths



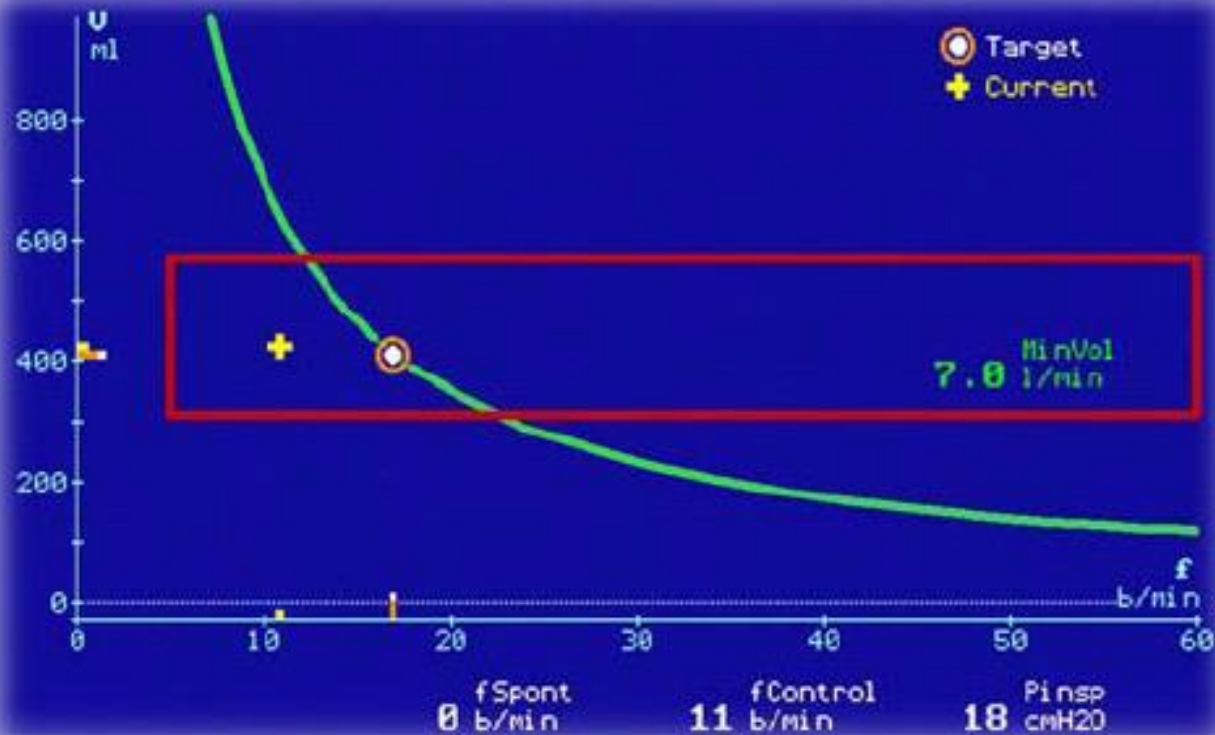
Assumptions



$V_d = 2.2 \text{ ml/kg i.b.w.}$

One major lung compartment (resistance & compliance)

Adaptive Support Ventilation (ASV): ventilator screen



The special ASV window, showing the (red) frame of maximum safety, the (green) curve indicating the range of all breath frequency/tidal volume values for the set minute volume, the (circle) Target marker indicating the frequency and tidal volume offering the lowest work of breathing, and the (cross) Current marker, showing the current status.

Adaptive Support Ventilation

