



Mimic natural breathing: Variable Pressure Support

By generating random changes in inspiratory pressure, Variable Pressure Support (Variable PS) mimics the subtle variability of normal breathing. Improved pulmonary function and a reduced risk of ventilator-associated lung injury (VALI) are the main potential effects of this gentle variation¹. Patients feel more comfortable and there are fewer adjustments to the ventilator settings.

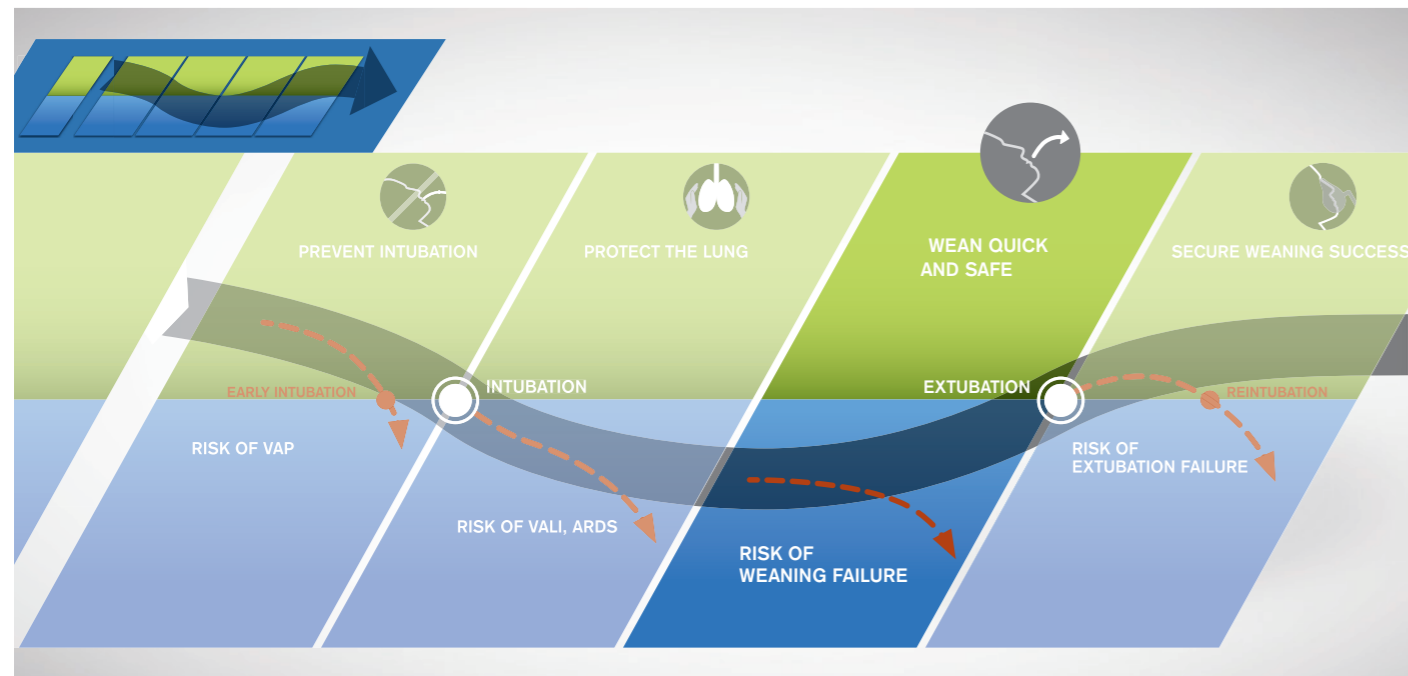
1. Effects of Different Levels of Pressure Support Variability in Experimental Lung Injury; Spiet P M, et al; Anesthesiology 2009; 110:342-50

“Lack of variability leads to extended mechanical ventilation.”^{2,3}

“Monotonic pressure-targeted ventilation is associated with the risk of progressive lung derecruitment.”⁴

“Lack of variability is associated with difficult weaning processes.”⁵

Wean the patient successfully as third step of the Respiration Pathway



MECHANICAL VENTILATION

As non-invasive as possible, as invasive as necessary. Along the Respiration Pathway a variance and diversity of treatment tools clearly improve the clinical decision-making.

The option **Variable Pressure Support** supports a quick and safe weaning for pediatric and adult patients.

Variable Pressure Support

Breathing is a cyclic activity with variable inspiratory and expiratory phases. It is almost impossible to observe two spontaneous breaths with exactly the same characteristics. This variability of spontaneous breathing is called “noise”.

Controlled mechanical pressure support ventilation is even characterized by fixed support level. To provide a more physiological respiratory pattern and to improve outcome, the option of Variable PS mimics noise of the nature. It generates random variation values in pressure support levels and then applies those values to the pressure support delivered to the patient. Finally, biologically variable ventilation or “noisy pressure support” seems to improve oxygenation and lung function.

Variation of ventilation follows a random function

The addition of noise (random changes) to a monotonously treated nonlinear biological system, such as the lung, induces stochastic resonance that contributes to the recruitment of collapsed alveoli and atelectasis in the lung segments. This random variation is based on the variability according to Gaussian normal distribution.

The level of Variable PS breaths follows a random function according to a Gaussian distribution. Regardless of the patient's spontaneous breathing effort, Variable PS therefore induces tidal volume variation. The variation is performed for every single breath. To make it easier for the user, the variability in Variable PS can be set directly in percent: “Press. Var. %”. Settings for “PEEP” and “ Δ PS” remain the same.

The amount of variation desired can be adjusted from 0 to 100%. The maximum possible variation is limited by the set P_{aw} high alarm threshold. If the variation level is set 100%, the maximum possible pressure is the PS-level + 100%. The minimum possible pressure is limited to the set CPAP level. Variable PS does not lead to increased mean airway pressure. Resultant mean values for inspiratory and expiratory tidal volumes are displayed.

The option can be used in conjunction with Automatic Tube Compensation (ATC®) and Apnea Ventilation.

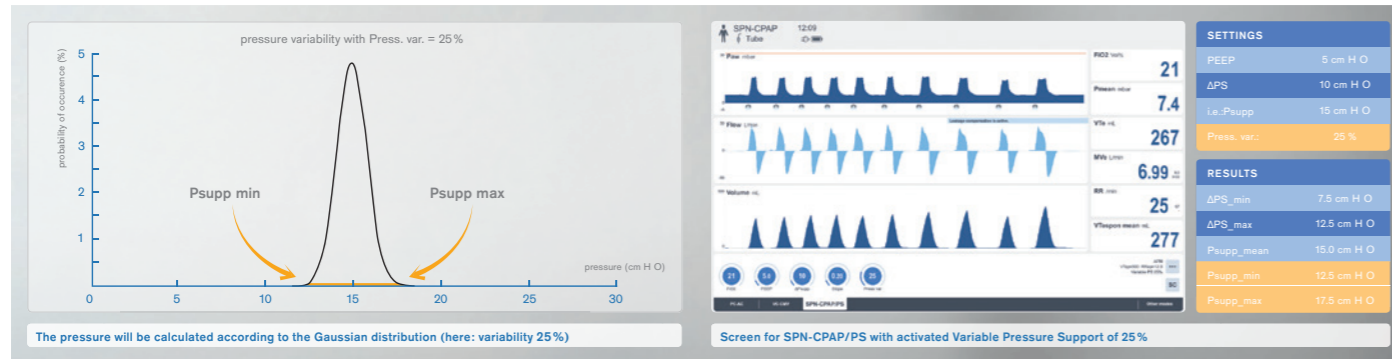
² Spieth PM et al.; Short-term effects of noisy pressure support ventilation in patients with acute hypoxemic respiratory failure.; Crit Care. 2013

³ Thille AW et al.; Patient-ventilator asynchrony during assisted mechanical ventilation.; Intensive Care Med. 2006

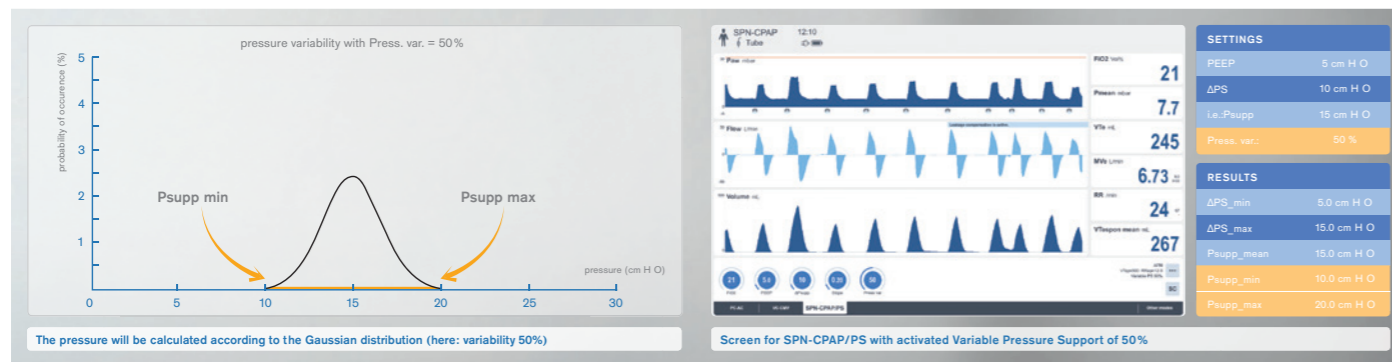
⁴ Gama de Abreu M et al.; Noisy pressure support ventilation: a pilot study on a new assisted ventilation mode in experimental lung injury.; Crit Care Med. 2008

⁵ Wysocki M et al.; Reduced breathing variability as a predictor of unsuccessful patient separation from mechanical ventilation.; Crit Care Med. 2006

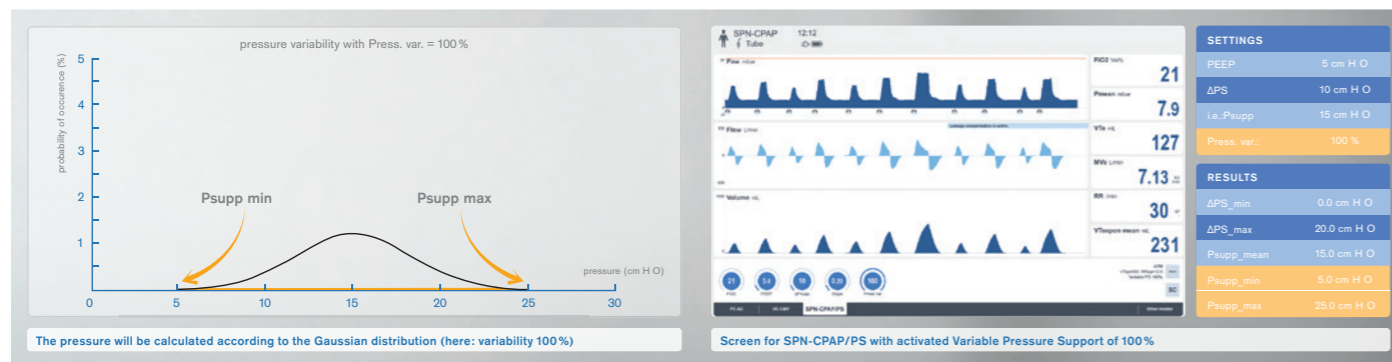
Pressure support variability 25%



Pressure support variability 50%



Pressure support variability 100%



Improved outcome with Variable PS

“More homogenous ventilation, surfactant production and pulmonary perfusion without negative hemodynamic effects of elevated intrathoracic pressures.” 4,6,7,8

“More natural breathing with improved patient ventilation synchrony.” 2,9,10

CUSTOMER INSIGHTS

“Variable Pressure Support ventilation could improve lung mechanics and thus unload the respiratory muscles at the same support level.”

Dr. Tommaso Mauri,
Milan, Italy

“Variable pressure support could replace traditional pressure support ventilation.”

Prof. Dr. med. habil.
Marcelo Gama de Abreu, DEWA

6 Spieth PM, Güldner A, Huhle R, et al.: Short-term effects of noisy pressure support ventilation in patients with acute hypoxemic respiratory failure. Crit Care 2013; 17: R261
 7 Gama de Abreu M, Spieth PM, Pelosi P, et al.: Noisy pressure support ventilation: a pilot study on a new assisted ventilation mode in experimental lung injury. Crit Care Med 2008; 36: 818–27
 4 Naik BI, Lynch C, Durbin CG. Variability in Mechanical Ventilation: What's All the Noise About? Respir Care. 2015;60(8):1203-10
 8 Mauri T, Lazzeri M, Bronco A, et al. Effects of Variable Pressure Support Ventilation on Regional Homogeneity and Aeration. Am J Respir Crit Care Med. 2017 1;195(5):e27-e28
 2 Arold SP, Suki B, Alencar AM et al. Variable ventilation induces endogenous surfactant release in normal guinea pigs. Am J Physiol Lung Cell Mol Physiol. 2003;285(2):L370-5.
 9 Morawiec E, Kindler F, Schmidt M. Comparative Effects of Variable Pressure Support, Neurally Adjusted Ventilatory Assist (NAVA) and Proportional Assist Ventilation (PAV) on the Variability of the Breathing Pattern and on Patient Ventilator Interaction Am J Respir Crit Care Med. 2015;191:A3163
 10 Vassilakopoulos T, Zakynthinos S. When mechanical ventilation mimics nature. Crit Care Med. 2008 36(3):1009-11.

Variable Pressure Support is available for the following Dräger ventilators:



D-12081-2019

Dräger Evita V800



D-12080-2019

Dräger Evita V600



D-76108-2013

Evita® Infinity V500*

Not all products or features are for sale in all countries or are only available as an option.

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* Infinity Acute Care System Workstation Critical Care

TECHNICAL DATA

Supplement for	SPN-CPAP/PS (in invasive mode only)
Adjustable	0-100%
Patient range	Adults and pediatrics

CORPORATE HEADQUARTERS
 Drägerwerk AG & Co. KGaA
 Moislinger Allee 53–55
 23558 Lübeck, Germany

www.draeger.com

Manufacturer:
 Drägerwerk AG & Co. KGaA
 Moislinger Allee 53–55
 23542 Lübeck, Germany

REGION DACH
 Drägerwerk AG & Co. KGaA
 Moislinger Allee 53–55
 23558 Lübeck, Germany
 Tel +49 451 882 0
 Fax +49 451 882 2080
info@draeger.com

REGION EUROPE
 Drägerwerk AG & Co. KGaA
 Moislinger Allee 53–55
 23558 Lübeck, Germany
 Tel +49 451 882 0
 Fax +49 451 882 2080
info@draeger.com

REGION MIDDLE EAST, AFRICA
 Drägerwerk AG & Co. KGaA
 Branch Office
 P.O. Box 505108
 Dubai, United Arab Emirates
 Tel +971 4 4294 600
 Fax +971 4 4294 699
contactuae@draeger.com

REGION ASIA PACIFIC
 Draeger Singapore Pte. Ltd.
 25 International Business Park
 #04-20/21 German Centre
 Singapore 609916
 Tel +65 6308 9400
 Fax +65 6308 9401
asia.pacific@draeger.com

REGION NORTH AMERICA
 Draeger, Inc.
 3135 Quarry Road
 Telford, PA 18969-1042, USA
 Tel +1 800 4DRAGER
 (+1 800 437 2437)
 Fax +1 215 723 5935
info.usa@draeger.com

REGION CENTRAL AND SOUTH AMERICA
 Dräger Panama S. de R.L.
 59 East Street, Nuevo Paitilla,
 House 30, San Francisco Town
 Panama City, Panama
 Tel +507 377 9100
 Fax +507 377 9130
servicioalcliente@draeger.com

Locate your Regional Sales Representative at:
www.draeger.com/contact

