


Mechanical Ventilation & Noninvasive Positive Pressure Ventilation (NIPPV)


Mechanical Ventilation


Positive inspiratory pressure delivered to a patient through an endotracheal tube


Indications for Ventilation:

Hypoxemia or hypercarbia due to lung pathology 

Inability to protect the airway

- Decreased consciousness (low GCS) 
- Impending airway obstruction

Impending respiratory failure due to excessively increased work of breathing 

O₂ Goals 

Oxygenation (\uparrow PaO₂)

- Increase FiO₂
- Increase PEEP

Ventilation (\downarrow PaCO₂)

- Increase RR
- Increase TV

Vent Parameters:



Tidal Volume (TV)

- Volume of air delivered per breath



Respiratory Rate (RR)

- Number of breaths delivered per minute



Fraction of Oxygen in Inspired Air (FiO₂)



Positive End-Expiratory Pressure (PEEP)

- Pressure to keep alveoli open at the end of expiration

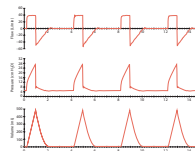


Peak Airway Pressure Delivered (Paw)

Ventilator Modes

Volume Control

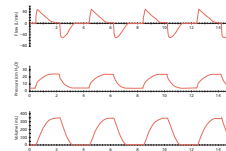
- TV is preset
- Paw varies



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Pressure Control

- Paw is preset
- TV varies



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Setting to allow patient to trigger breaths (arrows)

Pressure Support

- Pressure to assist a patient's breathing
- Used for weaning patients from the vent

Noninvasive Positive Pressure Ventilation


Assisted ventilation without the use of an endotracheal tube

Benefits

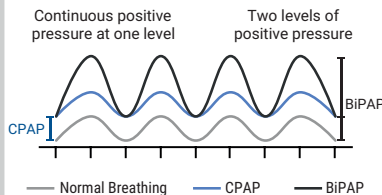


Intubation is not necessary

- No indwelling ET tube
- Lower risk of vocal cord injury
- Lower rate of infection

No sedation or neuromuscular paralysis is needed 

CPAP vs BiPAP



CPAP promotes oxygenation by keeping airways open (OSA)

BiPAP assists ventilation and removal of CO₂ (COPD exacerbation)

Contraindications

- Comatose state
- Inability to clear secretions
- Upper airway obstruction
- Respiratory arrest
- Mask intolerance & patient noncompliance