



Speaking Valve Use with Tracheostomy and Mechanical Ventilation: Now, We're Talking!

Presented in 2025

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Speaking Valve Use with
Tracheostomy and Mechanical Ventilation:
Now, We're Talking!



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Welcome!

- In-Person Considerations
 - Social awareness
 - Networking options
 - Presentations
 - Groups: Purple and Aqua
 - Hands-On
 - Demonstrations
 - Case studies/mock assessments
 - Panel discussions
 - Food and drink

- Chat with the clinicians!
- Meet fellow professionals.
- Learn about new resources.



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Speaker Disclosures:

Financial: Full-time with Passy-Muir, Inc.
Non-financial: No relevant non-financial disclosures

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Disclosure

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Seminar Overview

Fundamentals: From Tracheostomy Tubes to
Mechanical Ventilation Terminology



- 7.5 hours today
- Up to 6 recorded hours
 - 1 pre-requisite webinar hour
 - 5 post-seminar webinar hours
- 13.5 total hours, if all are completed.

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Seminar Participation



- Interactive questions
- Q & A
- Now, get your phones out.
- Let's try it!

6

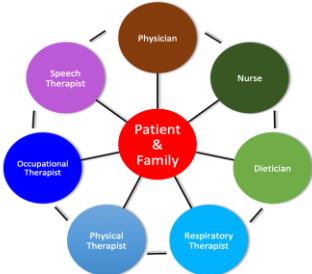
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Assessment and Placement: Non-Ventilator



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Interdisciplinary Airway Management Team



8

Begins in the ICU: Effects of Bed Rest



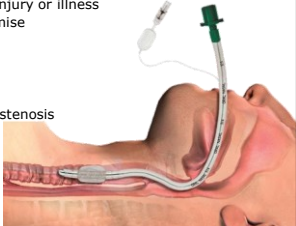
- The negative impact of bed rest is well known
- No evidence supports efficacy of bed rest
- Disuse atrophy at the cellular level begins within 4 hours of implementing bed rest
- Healthy adults, bed rest¹
 - Strength declined by 1 – 1.5% per day
 - Mood changes
 - Loss of coordination, balance and work tolerance
 - Casting: Strength declines by 25% in 7 day²

- Griffiths et al. (1995). Nutrition, 11:428-432
- De Jonghe et al. (2000). CCM, 5309-315

9

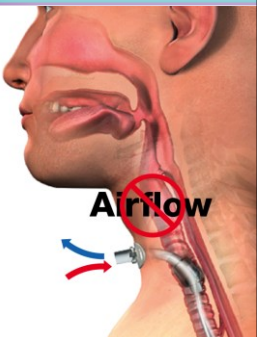
Endotracheal Tube Considerations

- Intubation
 - Why?
 - Respiratory compromise due to injury or illness
 - Potential for respiratory compromise
- Potential side effects
 - Mucosal injury
 - Injury to the vocal folds
 - Tracheal edema, ulceration, and stenosis



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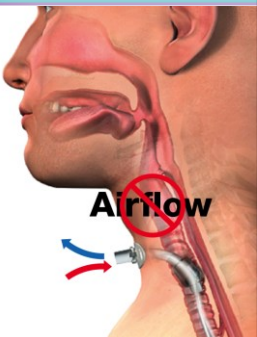
Physiologic Changes after Tracheostomy



Respiration:
Patient inhales and exhales through open trach tube. No airflow past inflated cuff

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Physiologic Changes after Tracheostomy



- Speech
- Smell
- Taste
- Sensation
- Reduced positive airway pressure
 - Poor secretion management
 - Reduced cough

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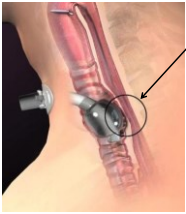
Cuff: Choices and Management

- Cuff up or down?
 - Purpose of cuff
 - Cuffs and aspiration
- Cuff pressures
 - 20 - 25 cmH₂O
 - Minimal leak
 - Minimal occlusion



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Clinical Complications of Cuff



- Esophageal impingement
- Backflow
- Necrosis and trauma
- Laryngeal tethering
- Late complications
 - Granuloma - stenosis
 - Tracheomalacia
 - Fistulae

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Application of the PMV:
Non- Ventilator



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Researchers: Medical errors now third leading cause of death in United States

such as communication breakdowns when patients are handed off from one department to another.

Published: May 3, 2016



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Reminder: Passy-Muir Valve



Bias-closed

No-leak

PMV 2001 (Purple color™)

What are the benefits of the Valve?

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Benefits of Closing the System with PMV

- Restores normal physiology
- Reconnects the upper and lower airway
- Providing a closed system
 - Communication
 - Smell and taste
 - Secretion management
 - Sensation
 - Cough
 - Swallowing
 - Positive airway pressure
 - Quality of life



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Psychological Benefits

Communication with family

Participation in decision making

Reduced sense of isolation/ anxiety

Better sense of well-being

Communication with caregivers

• Freeman-Sanderson, A. L., Tagher, L., Elms, M. R., & Kenny, B. (2018). Quality of life improves for tracheostomy patients with return of voice: A mixed methods evaluation of the patient experience across the care continuum. *Intensive Critical Care Nursing*, 46, 10-16. doi:10.1016/j.iccn.2018.02.004
• Freeman-Sanderson, A. L., Tagher, L., Elms, M. R., & Phipps, P. R. (2016). An intervention to allow early speech in ventilated tracheostomy patients in an Australian intensive care unit (2019): A randomized controlled trial. *Respiratory Critical Care*, 20(2), 134. doi:10.1080/13676047.2015.103112
• Freeman-Sanderson, A. L., Tagher, L., Elms, M. R., & Phipps, P. R. (2016). Quality of life improves with return of voice in tracheostomy patients in intensive care: An observational study. *Journal of Critical Care*, 31, 286-294. doi:10.1016/j.jcc.2016.01.012
• Freeman-Sanderson, A. L., Tagher, L., Elms, M. R., & Phipps, P. R. (2016). Return of voice for ventilated tracheostomy patients in ICU: A randomized, controlled trial of early-targeted intervention. *Critical Care Medicine*, 44(5), 1070-1081. doi:10.1097/ccm.0000000000001010

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Impact on PEEP

- Closed System vs Open
 - Improved gas exchange
 - Improved oxygen saturation levels
 - Decreased risk of atelectasis
- “My patient is not tolerating cuff deflation trials”



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Initiating the Assessment: Team Approach

- Have a plan: Who does what
- Block off the time
- Education
- Reassure the patient
- Perform good oral care
- Suctioning as needed
- Body position and posture
- Position of head, neck, and tracheostomy tube



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Patient Selection

- Awake and alert
- Medically stable
- Complete cuff deflation
- Manageable secretions
- Patent upper airway



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Checklist: Take Baseline Measurements

- Oxygenation
- Vital signs
- Breath sounds
- Color
- Work of breathing
- Patient responsiveness



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Education



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Warning Label



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Suctioning

- Competencies
- When to suction
- How often
- Oral and tracheal
- Secretions?
 - Color
 - Smell
 - Thickness



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Deflate Cuff



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Assess Upper Airway Patency

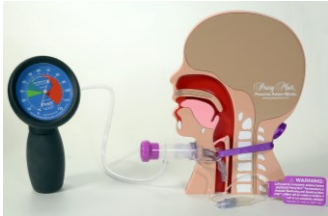
- Deflate cuff
- Ask patient to inhale
- Finger occlude and speak or cough on exhalation
- Transtracheal pressure measurements



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Assessment for Placement

- Transtracheal pressure measurements
 - Back pressure
 - Air trapping
 - Assessing for patent upper airway

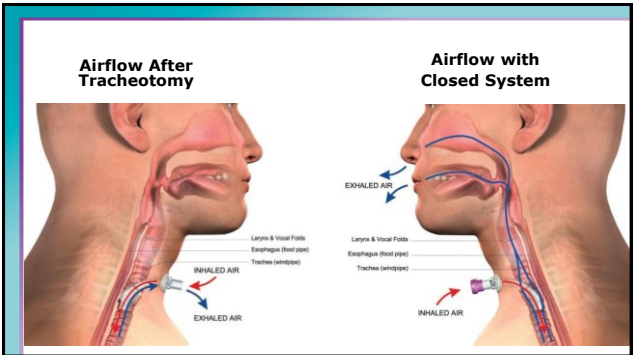


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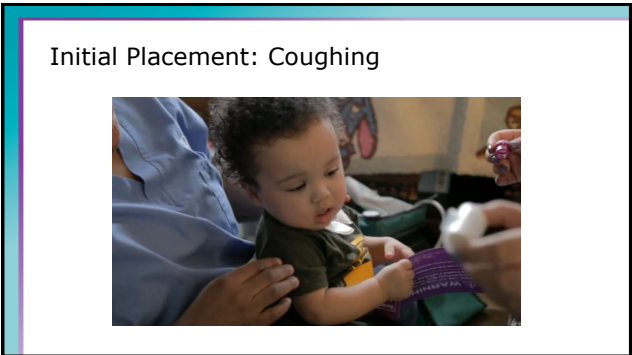
PMV Placement



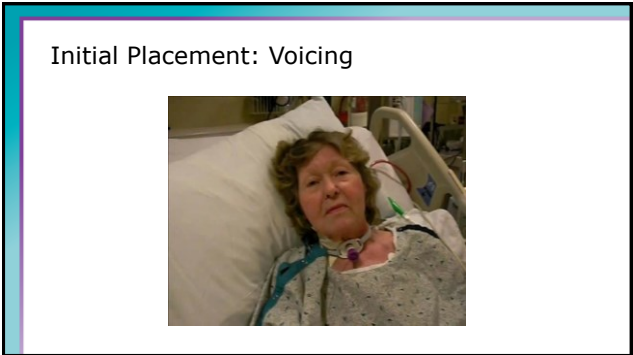
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Advantages of a Closed Respiratory System vs Open Tracheostomy

- Open tracheostomy
 - Reduced airflow
 - Reduced positive airway pressure
 - Reduction in the pressurized system
- Closed Respiratory System
 - Allows graded exhalation and pressure regulation
 - Feeding and Swallowing
 - Posture and balance
 - Upper extremity force/strength



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Pressurized System

- Restored or improved pressurized system:
 - Intraoral
 - Subglottic pressure
 - Respiratory – PEEP
 - Esophageal ??
 - Intrathoracic
 - Respiratory
- Leads to improved:
 - Feeding and swallowing
 - Cough and throat clear
 - Trunk support and postural control
 - Respiratory function



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Wear Time

- Patient specific
 - Patient's cognitive status
 - Medical needs
- Minutes to hours
- Treatment plan



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More Education



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Care and Cleaning

- Lifetime of 2 months







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Decannulation



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Pre and Post Decannulation



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In Summary: What has been accomplished?

- Early intervention:
 - Avoid disuse atrophy
- Close the system to improve:
 - Phonation: access to vocal communication
 - Sensation and secretion management: cough and throat clear
 - Taste and smell
 - Time to weaning and decannulation



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Thank you!
Any questions?



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Breakout Sessions:
Tracheostomy Tubes and PMVs,
Cuff Management, and
Mock Assessments



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Tracheostomy Tubes and PMVs:
Purple Team



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Cuff Management:
Aqua Team



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Mock Assessments:
Purple and Aqua Teams



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Case Study #1: SLP

- 68 y/o male
- Admitted for complications related to OSA
- PMH: obstructive sleep apnea, hypertension, type II diabetes, hypercapnia, chronic pain, BMI > 40, peripheral neuropathy, GERD, nocturnal CPAP with full face mask, depression
- Surgical history:
 - Prior admission: Patient had tonsillectomy to improve airflow through the upper airway with full face CPAP mask.
 - Current: Surgical tracheotomy performed 4 days ago. Patient received #8 Shiley XLT, cuffed.
- Patient is awake and alert, communicating with finger occlusion and nonverbal communication (gestures and writing) during the day. Patient demonstrates frequent coughing and is suctioned regularly.
- Consult received for PMV assessment.

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Case Study #2: SLP

- 59 y/o male
- Admitted for surgical management of laryngotracheal stenosis
- PMH: laryngotracheal stenosis, lupus, HTN, GERD, depression, CAD, lupus nephritis
- Surgical history:
 - Laryngotracheal reconstruction
 - Suprastomal stent
 - Tracheotomy with #6 cuffless Shiley
- Patient is awake and alert, medically stable, demonstrating desire to communicate
- Consult received for PMV assessment

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Case Study #3: SLP

- 52 y/o female
- Admitted for SOB
- PMH: hypertension, type II diabetes, chronic kidney disease, SARS-CoV-2, dyspnea, airway stenosis
- Previous hospitalization: SARS-CoV-2, intubated for 26 days, discharged 1 week ago to inpatient rehabilitation
- Patient continued to complain of shortness of breath with rest and exertion, occasional stridor noted, crackling breath sounds
- Surgical history:
 - Laryngoscopy: airway stenosis
 - Surgical tracheotomy: # 6 Bivona TTS
- Chest X-ray: RLL pneumonia, aspirates
- MBSS: open tracheostomy tube, pharyngeal dysphagia with aspiration of thin liquids
- Supplemental oxygen at 3L via trach mask
- Consult received for PMV assessment.

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Troubleshooting and Treatment



50

Cuff issue?



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Transitioning and Troubleshooting

```
graph TD; A[What if the patient cannot voice or has difficulty?] --> B[What are the steps to consider?]; B --> C[Step 1: Check the cuff status and patient positioning]; C --> D[Step 2: Reassess airway patency]; D --> E[Step 3: Assess the stoma/leak]; E --> F[Step 4: What to do next?];
```

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No Voice



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Too Many Secretions



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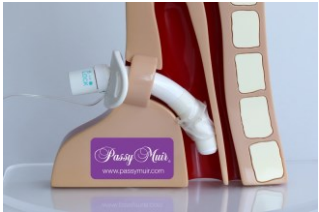
Back Pressure



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Factors Affecting Expiratory Air Flow

- Size or type of tracheostomy tube
- Presence and degree of obstruction
- Edema
- Secretions
- Incomplete cuff deflation
- Tube position



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Airway Obstruction



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Troubleshooting:
Downsize or Different Brand Tube

Trach A

Trach B



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Resolution



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Goals and Goal Writing

- Wear time
 - Patient will wear the speaking Valve:
 - For ____ minutes to improve communication.
 - During ____-minute therapy session without need for Valve removal.
 - For ____-hour periods of time while awake.
- Other goals that impact wear time but not timed-based
 - Participate in conversation with audible voicing on ____ out of ____ sentences.
 - Complete ____ number of RMT tasks while wearing the speaking Valve.

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Questions to Determine Therapy

- What is diagnosis?
- Why do they have difficulty with:
 - Voice?
 - Breath support?
 - Language and/or cognition?
 - Dysarthria?
- What about swallowing?

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Break: 15 Minutes (Lunch)



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LUNCH



& LEARN

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Basics of Ventilator Application
of the No-leak Valve



1

Indications for Invasive Mechanical
Ventilation

- Can no longer support with NIV
- Airway protection
- Hypercapnic respiratory failure
- Hypoxemic respiratory failure
- Cardiovascular distress
- Anticipated patient decline or impending transfer

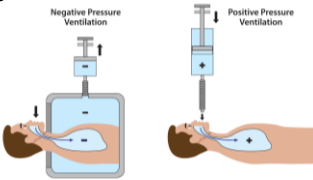


2

Positive Pressure Ventilation

- The primary approach to mechanical ventilation is positive pressure
- The flow's driving pressure is higher than the pressure inside the lungs
- The pressure is high enough to overcome resistance

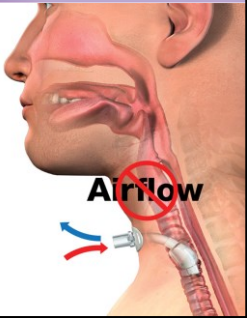
Negative Pressure vs Positive Pressure Ventilation



3

Invasive Ventilation

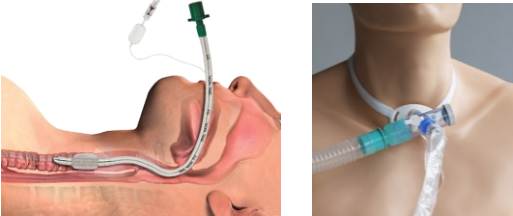
- Usually requires airway to be sealed with little to no leak present.
- Seal is achieved with a cuff at the end of the artificial airway.



4

Invasive Ventilation

- Endotracheal Tube
- Tracheostomy Tube



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Modes of Ventilation

- Control Modes
 - Continuous Mandatory Ventilation (CMV)
 - Assist Control (A/C)
- Spontaneous Modes
 - Pressure Support (PS)
 - Continuous Positive Airway Pressure (CPAP)
- Combination Mode
 - Synchronized Intermittent Mandatory Ventilation (SIMV)



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Ventilator Settings

Requiring physician order:

Therapist driven:

- Mode (A/C, SIMV)
- Breath Type:
 - Pressure Control (PC)
 - Volume Control (VC)
 - Pressure Support (PS)
 - Pressure Regulate Volume Control (PRVC)
- Frequency (f)/Respiratory Rate (RR)
- Positive End-Expiratory Pressure (PEEP)

- FiO₂
- Flow rate
- Trigger sensitivity
- Inspiratory time/flow limits
- Alarm settings

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The screenshot shows a ventilator control interface with multiple waveforms (volume, pressure, flow) and numerical readouts for parameters like PIP (27), PEEP (6.3), RR (12), and SpO2 (99%).

Measured Ventilator Parameters

- Exhaled Tidal Volume
- Exhaled Minute Volume
- Peak Inspiratory Pressure (PIP)
- Total Respiratory Rate
- Mean Airway Pressure
- PEEP

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Steps For In-line Valve Placement

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Why use a Passy-Muir Valve with patients who are mechanically ventilated?

- Verbal communication
- Improved lung recruitment and diaphragm involvement
- More rapid weaning from the ventilator
 - Rehabilitation tool
- Improved secretion management
 - More effective cough
 - Reduces need for suctioning
- Improves quality of life



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Step 1: Assessment

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Patient Selection Criteria



- Awake and alert
- Hemodynamically stable
- Able to manage complete cuff deflation
- Manageable secretions
- Patent Airway

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Establish Baseline:
Assess Vital Signs and Work of Breathing

- Oxygenation
- Vital Signs
- Breath sounds
- Color
- Work of breathing
- Patient responsiveness



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Assess Ventilator Parameters

Three parameters that give you the general state of your patient's respiratory status:

1. FiO_2
2. PEEP
3. PIP



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Assess Ventilator Parameters



FiO_2

- Fraction of inspired oxygen
- Room Air 21%
- Supplemental $\text{O}_2 > 21\%$

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Assess Ventilator Parameters



PEEP

- Positive End-Expiratory Pressure
- Resistance to exhaled volume that creates back flow and pressure that stents the alveoli open
- PEEP and FiO_2 work together to improve oxygenation

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Assess Ventilator Parameters



PIP (Peak Inspiratory Pressure)

- The max amount of pressure to deliver volume
- Sum of the inspiratory pressure required to deliver volume + PEEP
- PIP indicates the compliance of the lungs

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Suggested Ventilator Parameters

- $\text{FiO}_2 \leq .50$
- $\text{PEEP} \leq 10 \text{ cmH}_2\text{O}$
- $\text{PIP} \leq 40 \text{ cmH}_2\text{O}$
- Any conventional mode of ventilation is compatible with the Valve.



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Step 2: Patient Preparation and Education

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Team Approach

- Timing and tube selection
- Introducing a speaking valve
- When to downsize
- Plan of care
- Decannulation
- Impacts continuity of care
- Impacts safety, length of stay, and cost



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Patient Preparation

- Body position and posture
- Position of head, neck, and tracheostomy tube



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Pre-Placement, General Observations, and other Considerations

- Have a plan and block time
 - Pick a good time of the day
 - Reduce noise and interference
- Education
 - Reassure the patient
- Address pain issues
- Position the patient



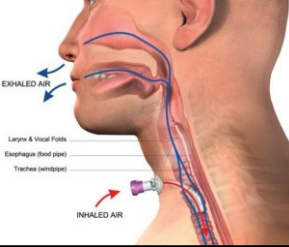
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Step 3: Assess For Airway Patency

24

Airway Patency Assessment with Mechanical Ventilation

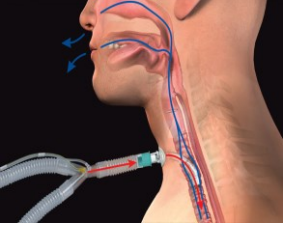
- Requires complete cuff deflation
- Assess the leak or airflow into the upper airway
- Use vent parameters to determine airway patency
- The type of breath matters



25

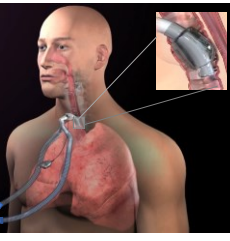
Cuff Deflation and Mechanical Ventilation

1. Set parameters do not change when cuff is deflated.
2. Cuff deflation generates less resistance to flow.
3. Ventilatory system is no longer sealed, there is a leak.



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VC: Patient Assessment



PIP	25 cmH ₂ O
PEEP	5 cmH ₂ O
FiO ₂	30%
Vt	500 mL
Vte	500 mL

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Ventilator Assessment

- Note Vent Settings:
 - Set Vt
 - PEEP
 - RR/f
 - FiO₂
- Note Vent Measurements
 - PIP
 - Exhaled Vt (Vte)
 - Total RR
 - MV



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Upper Airway Patency Assessment

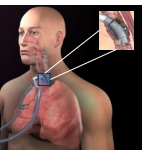
- Turn Down PEEP
 - PEEP down by 5
- Then,
 - Slow cuff Deflation



29

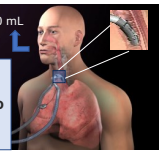
Upper Airway Patency

Cuff Inflated-Closed Circuit



PEEP	5 cm H ₂ O
FiO ₂	.30
PIP	25 cmH ₂ O
Vt	500 mL
Vte	500 mL

Cuff Deflated-Open Circuit



PEEP	0 cmH ₂ O
FiO ₂	.30
PIP	10 cmH ₂ O
Vt	500 mL
Vte	250 mL

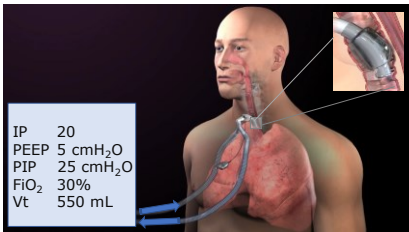
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Upper Airway Patency Assessment



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PC: Patient Assessment



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Ventilator Assessment

- Note Vent Settings:
 - Set IP
 - PEEP
 - RR/f
 - FiO₂
- Note Vent Measurements
 - PIP
 - Exhaled Vt (Vte)
 - Total RR
 - MV



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Upper Airway Patency Assessment

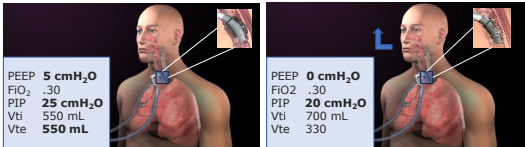
- Turn Down PEEP
 - PEEP down by 5
- Then,
 - Slow cuff Deflation



34

Upper Airway Patency

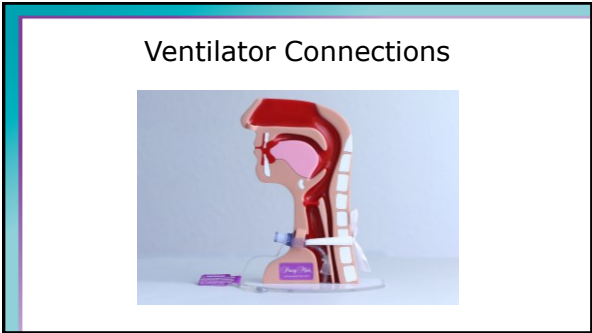
Cuff Inflated-Closed Circuit Cuff Deflated-Open Circuit



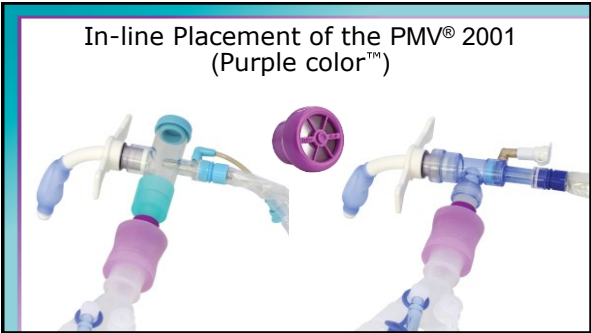
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Step 4: Assemble the Necessary Parts & Pieces

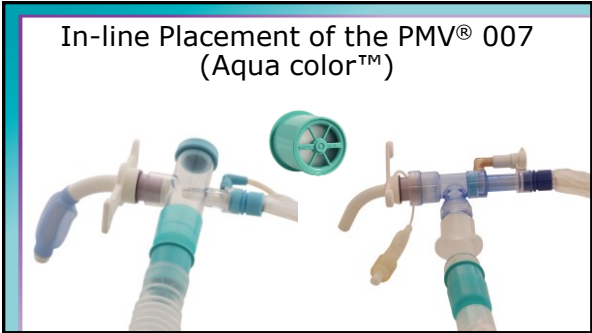
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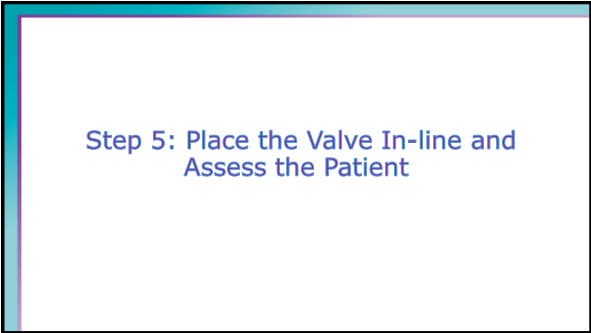
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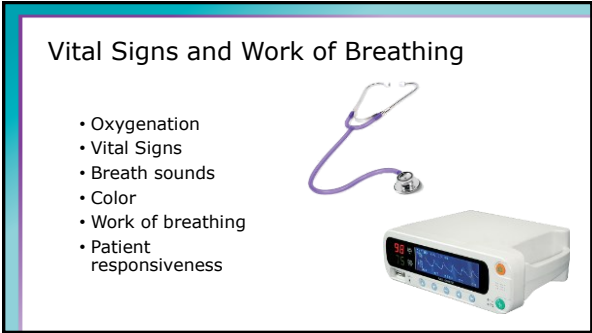
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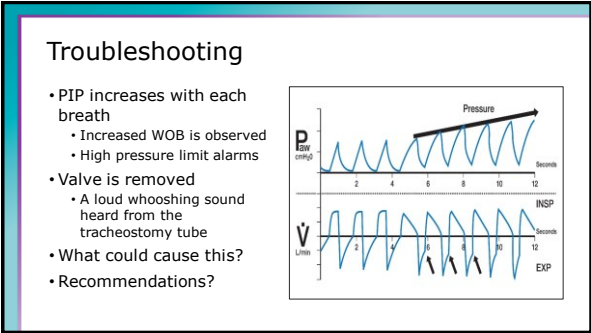
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Listen for Back Pressure



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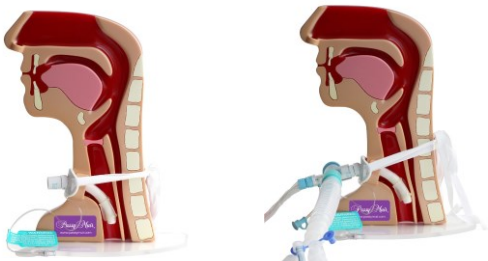
Factors Affecting Airway Patency

- Tracheostomy tube
- Cuff issues
- Airway obstruction



44

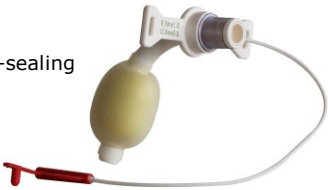
Importance of Tube Position



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FOME-Cuff®

Self-sealing



CONTRAINDICATED For Passy-Muir Valve USE

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Step 6: Adjust the Vent as Necessary

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Consider Switching to NIV



- Approach to breath delivery is very similar to invasive ventilation.
- Difference is, there is almost always a leak present.

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NIV

- Almost always a leak present.
- Flow loss makes it difficult to measure pressures and volumes.
- Most parameters are calculated instead of measured.



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Considerations with NIV

- Airway patency assessment should not be done in NIV.
- Uses the same settings or as close as possible.
- Maybe necessary to do a trial prior to cuff deflation and Valve placement.



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Ventilator Assessment and Adjustments

- Adjust PEEP
- Evaluate sensitivity
 - Pressure vs. Flow Trigger



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Ventilator Assessment and Adjustments

- Volume compensation
 - Increase V_T in small increments to achieve pre-cuff deflation PIP



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Ventilator Assessment and Adjustments

- Pressure Ventilation
 - May adjust to achieve audible voice and adequate ventilation



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Ventilator Assessment and Adjustments

- Flow limit
 - Increase the % flow deceleration
 - Ranges 20 to 80%
- Time limit
 - Set I-time
 - 1 second for most adults



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Alarm Settings – Safe Practice

Low exhaled Vt and Ve alarms

Low pressure alarm

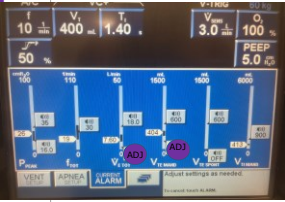
High pressure alarm

High respiratory rate

• Set 5 to 10 cmH₂O below PIP

• Set 10 cmH₂O above PIP

• 10 to 15 above baseline



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Ventilator Settings and Alarm Management



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Case Study



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Gil

• Ventilator settings:

• A/C RR 8

• V_T 700 mL

• PIP 25 cmH₂O

• PEEP 5 cmH₂O

• F_IO₂ .28

• Tracheostomy

• 1 month

• Size 8 Shiley XLT



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Cuff Deflation Assessment

• Adjust PEEP

• Slow cuff deflation

• Ventilator:

• Exhaled V_T 300 mL

• PIP 12 cmH₂O

• Patient:

• Weak cough

• Voicing

• Should the Valve be placed in-line?



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Vent Changes Increase Success

• Valve is placed in-line

• Assessment reveals:

• Whispers only

• Poor chest expansion

• Increased RR

• What ventilator change could be made?



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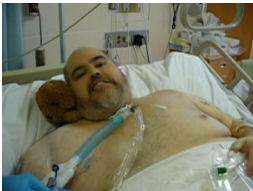
Vent Changes Increase Success

• Vent change:

• Increase V_T to meet

but not exceed pre-cuff

deflation PIP



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Gil



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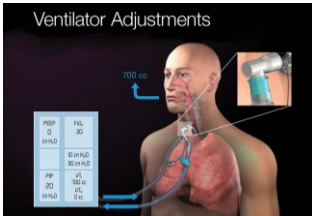
Breakout Sessions:
Ventilator Application and
Mock Assessments



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Ventilator Demonstration
Purple Group

Ventilator Adjustments



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Placing a Valve In-Line
Aqua Group





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Mock Assessments
Purple and Aqua Groups



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Trachlore, Barriers, and More

• Panel Discussion – starting point:

• You have to wait until a patient is weaned from the ventilator.

• Our patients are too sick to use a Valve.

• You need a fenestrated tracheostomy tube.

• We have to keep the cuff inflated due to aspiration.

• My patient cannot tolerate cuff deflation trials, so they are not ready for a Valve.

• My patient speaks with a leak, so a Valve is not needed.

• What have you heard?

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Receiving CEUs for this Course



• You will have 5 days from the time this course ends to complete the evaluation, which is required to receive credit

• Go to: <https://ep.passy-muir.com>

• Login or create an account

• Click on the purple box

- Upper righthand corner
- Labeled "Enter Meeting Code Here"

• The meeting code is:

Enter Meeting Code Here

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