Speaking Valve Use with Tracheostomy and Mechanical Ventilation: Now, Weôre Talking!

Presented in 2026

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

1

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

2

Speaker Disclosures:

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

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Disclosure

Portions of the information in this seminar relate to products of Passy-Muir, Inc. The content of the seminar is for your general educational information only. Information you learn cannot replace your clinical judgment or the judgment of treating physicians and other healthcare professionals working with patients. The information provided in this seminar should not be considered as medical advice.

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Seminar Overview

- 8 hours today
- Up to 6 recorded hours
  - 1 pre-requisite webinar hour
  - 5 post-seminar recorded webinar hours
- Up to14 total hours, if all are completed.

5

Seminar Participation

6

slido

What is the actual color of the PMV 007?

Start presenting to display the poll results on this slide.

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Assessment and Placement: Non-Ventilator

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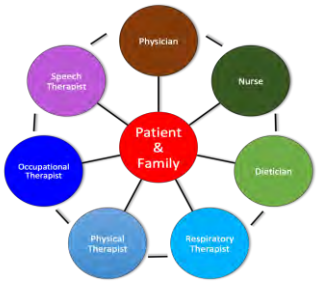
Interdisciplinary Airway Management Team



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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 rest[1]
  - Strength declined by 1 – 1.5% per day
  - Mood changes
  - Loss of coordination, balance and work tolerance
  - Casting: Strength declines by 25% in 7 day[2]

1. Griffiths et al. Nutrition 1995; 11:428-432
2. De Jonghe et al. CCM 2000; S309-315

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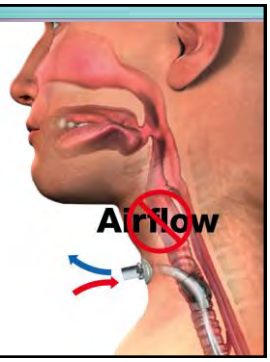
Physiologic Changes after Tracheostomy

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



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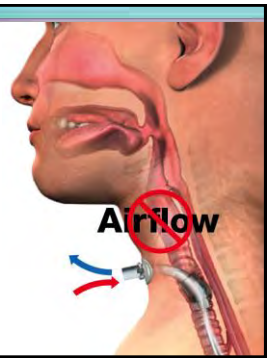
Physiologic Changes after Tracheostomy

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



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Cuff Management or Clinical Complications Happen

- Esophageal impingement
- Backflow
- Necrosis and trauma
- Laryngeal tethering

- Late complications
  - Granuloma - stenosis
  - Tracheomalacia
  - Fistulae

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Application of the PMV: Non- Ventilator

14

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

PMV 2001 (Purple color™)

Bias-closed

No-leak

What are the benefits of the Valve?

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What is a benefit of using the Passy Muir Valve?

ⓘ Start presenting to display the poll results on this slide.

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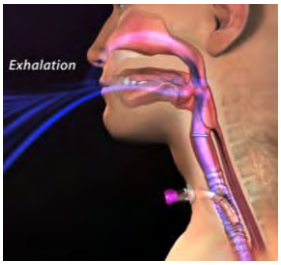
Benefits of Closing the System with PMV

- 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., Togher, L., Elkins, 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., Togher, L., Elkins, M. R., & Phipps, P. R. (2016). An intervention to allow early speech in ventilated tracheostomy patients in an Australian intensive care unit (ICU): A randomised controlled trial. Australian Critical Care, 29(2), 114. doi:10.1016/j.aucc.2015.12.012
- Freeman-Sanderson, A. L., Togher, L., Elkins, 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, 33, 186-191. doi:10.1016/j.jcrc.2016.01.012
- Freeman-Sanderson, A. L., Togher, L., Elkins, 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(6), 1075-1081. doi:10.1097/ccm.0000000000001610

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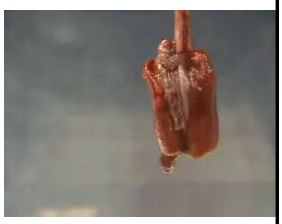
Impact on PEEP

- 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

22

Patient Selection

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

23

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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What is the best way to determine that the cuff is fully deflated?

ⓘ Start presenting to display the poll results on this slide.

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Deflate Cuff

29

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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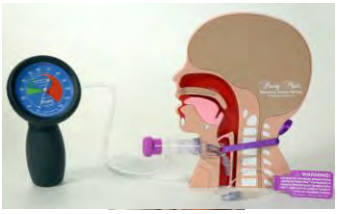
Assessment for Placement

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



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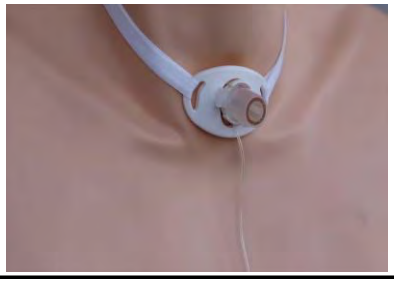
PMV Placement



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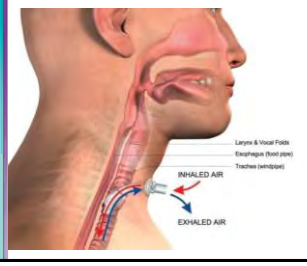
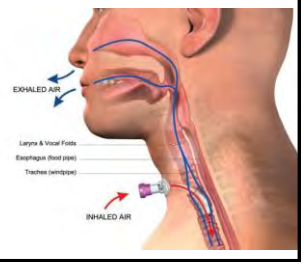
Airflow After Tracheotomy



Airflow with Closed System



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Initial Placement: Coughing

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Initial Placement: Voicing

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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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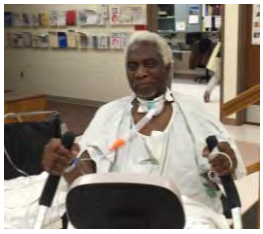
Pressurized System

- 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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More Education

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Care and Cleaning

- Average lifetime of 2 months



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Decannulation: Troubleshooting and Interventions

40

Pre and Post Decannulation

41

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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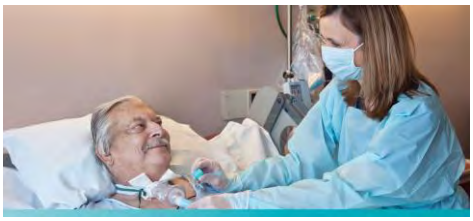
Thank you!
Any questions?



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

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Tracheostomy Tubes and PMVs

45

Cuff Management

46

Mock Assessments

47

Mock Assessment One

48

What were some signs of distress that the patient was showing?

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What are possible causes of 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

51

Airway Obstruction

52

Troubleshooting:
Downsize or Different Brand Tube

Trach A

Trach B

53

Resolution

54

What was the resolution?

55

Mock Assessment Two: Low Level

56

What are your primary considerations with a low-level patient?

57

58

What could be some causes of her back pressure?

59

60

What would be your next step for therapy?

61

62

Why is using a PMV during ammonia testing beneficial?

63

Troubleshooting Expiratory Air Flow

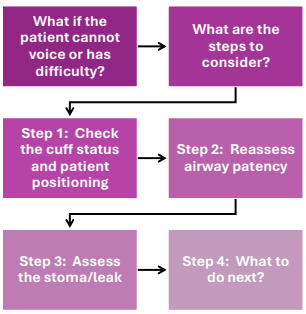
- Excessive coughing?
- No voice?
- Anxiety?

64

Troubleshooting and Treatment

65

Transitioning and Troubleshooting



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Voice?

67

Secretions?

68

Cuff issue?

69

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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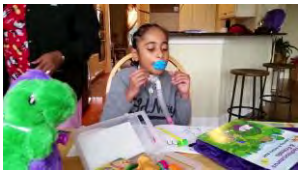
Wear Time

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



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Goals for treatment

- 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 goal areas that impact wear time
  - Participate in conversation with audible voicing on _____ out of _____ sentences.
  - Complete _____ number of RMT tasks while wearing the speaking Valve.

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Break: 15 Minutes (Lunch)

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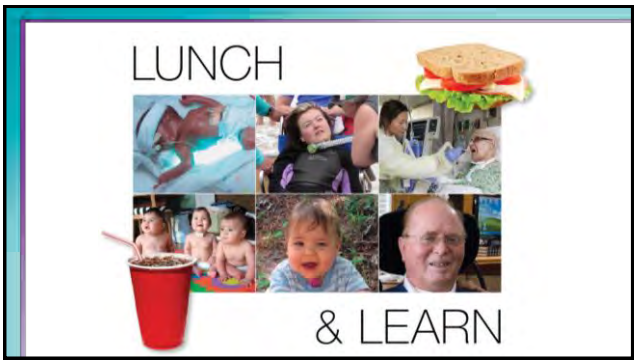

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Audience Q&A

75

Basics of Ventilator Application of the No-leak Valve

1

Can Patients Drink While Ventilated?

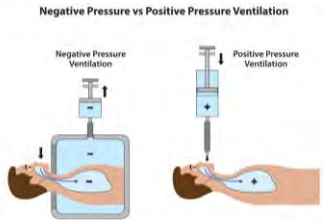
2

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

3

Positive Pressure Ventilation



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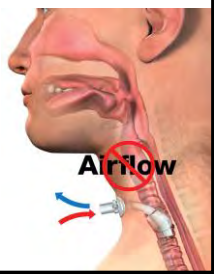
Invasive Ventilation

- 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.



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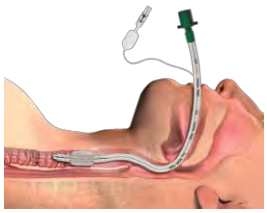
Invasive Ventilation

- Endotracheal Tube



- Tracheostomy Tube

6

A drive through settings & modes of ventilation

7

Mode=who's driving?

- How is the breath controlled:
  - Full control
  - Assist control
  - Support only

8

Mandatory vs. Spontaneous Breathing

- Mandatory breaths:
  - Given by the vent at a set rate
- Spontaneous breath:
  - Started by the patient

9

Settings=How the drive feels

- **Rate** (RR)-breaths per minute (like cruise control speed)
- **Tidal Volume** (VT)-size of each breath
- **Pressure**-force pushing air in
- **PEEP**- small amount of pressure left in the lungs at the end of exhalation, so they don't collapse
- **FiO_2** – percent of oxygen in the air given (room air is ~21%)

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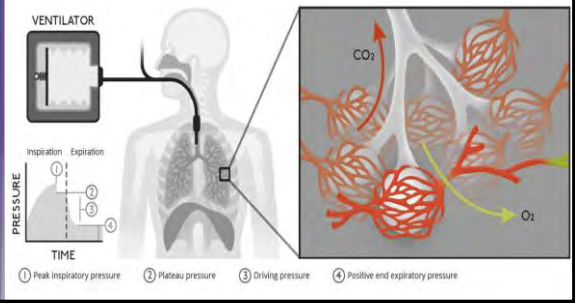

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Conventional vs. Non-Conventional Ventilation

Conventional Ventilation	Non-Conventional Ventilation
• Follows a normal inhalation exhalation (normal breathing) • Closely mirrors how one breathes without support	• Does not follow normal breathing patterns • Used when lungs are damaged – air is changed to protect them

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Modes of Ventilation

Compatible with PMV Use:

- A/C, VC, & PC
- SIMV
- CPAP/PS
- NIV

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Modes of Ventilation

Not recommended with PMV:

- PRVC
- AVAPS
- NAVA
- Other "auto" adjusted modes

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PRVC

- Vent delivers a set tidal volume
- Pressure adjusts automatically to achieve the target tidal volume
- Combines the benefits of volume and pressure control

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Measured Ventilator Parameters

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

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Can Patients Eat While Ventilated?

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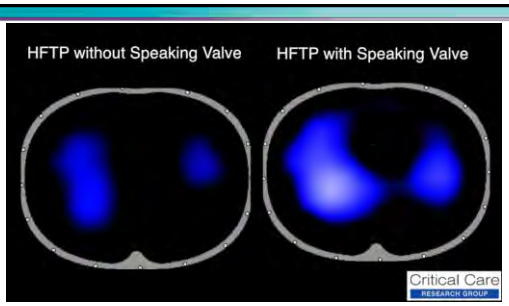

(Sutt et al. (2016). *Critical Care.* 20:91)

18

Steps For In-line Valve Placement

19

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

22

Patient Selection Criteria

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

23

Establish Baseline: Assess Vital Signs and Work of Breathing

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

24

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 O_2 > 21%

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Assess Ventilator Parameters

PEEP

- Positive End-Expiratory Pressure
- Extra pressure left in the lungs at the end of exhalation 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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"Must Know" for PMV Use

- $FiO_2 \leq .50$
- PEEP $\leq$ 10 cmH_2O
- PIP $\leq$ 40 cmH_2O
- VTi & VTe
- Patient stability and ability to manage secretions and tolerate cuff deflation

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Step 2: Patient Preparation and Education

30

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

31

Patient Preparation

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

32

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

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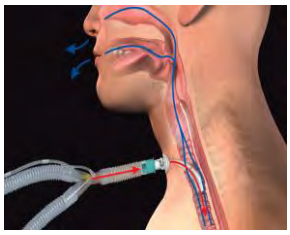
Airway Patency Assessment With Mechanical Ventilation

- Requires complete cuff deflation
- Assess the leak or airflow into the upper airway
- Use vent parameters to determine airway patency



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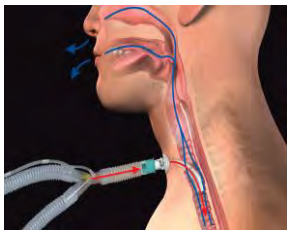
Cuff Deflation and Mechanical Ventilation

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



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Settings in Volume Ventilation

- VT
- RR/f
- PEEP
- Inspiratory Time
- Trigger Sensitivity
- FiO_2
- Alarms

37

Ventilator Assessment

- Note Vent Settings:
  - Set Vt
  - PEEP
  - RR/f
  - FiO_2
- Note Vent Measurements
  - PIP
  - Exhaled Vt (Vte)
  - Total RR

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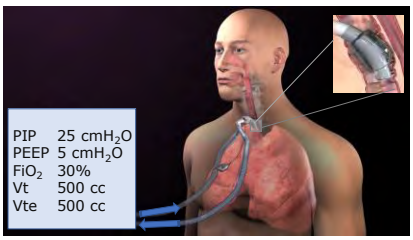
VC: Patient Assessment



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Upper Airway Patency Assessment

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

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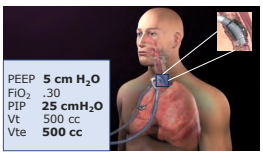
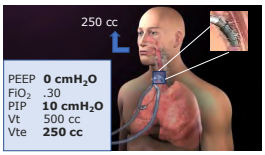
Upper Airway Patency

Cuff Inflated-Closed Circuit



Cuff Deflated-Open Circuit



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Upper Airway Patency Assessment

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Settings in Pressure Ventilation

- Inspiratory Pressure
- RR/f
- PEEP
- Inspiratory Time
- FiO_2
- Trigger Sensitivity
- Alarms

43

Ventilator Assessment

- Note Vent Settings:
  - Set IP
  - PEEP
  - RR/f
  - FiO_2
- Note Vent Measurements
  - PIP
  - Exhaled Vt (Vte)
  - Total RR

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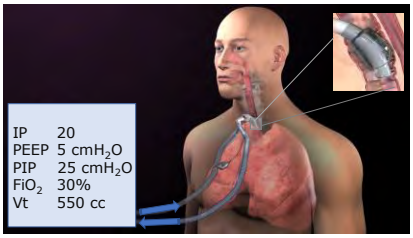
PC: Patient Assessment



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Upper Airway Patency Assessment

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

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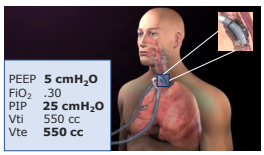
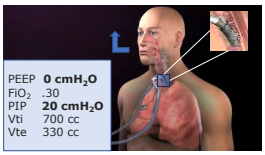
Upper Airway Patency

Cuff Inflated-Closed Circuit



Cuff Deflated-Open Circuit



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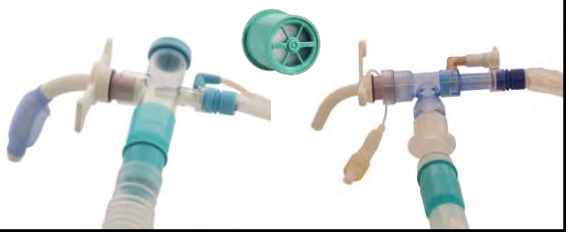
Step 4: Assemble the Necessary Parts & Pieces

48

Ventilator Connections

49

In-line Placement of the PMV® 007 (Aqua color™)



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In-line Placement of the PMV® 2001 (Purple color™)

51

Apply Pilot Balloon Warning Label

52

Step 5: Place the Valve In-line and Assess the Patient

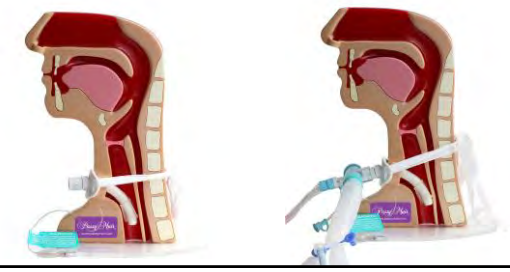
53

Factors Affecting Airway Patency

- Tracheostomy tube
- Cuff issues
- Airway obstruction

54

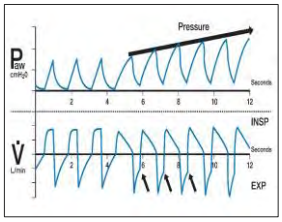
Importance of Tube Position



55

Troubleshooting

- PIP increases with each breath
  - Increased WOB is observed
  - High pressure limit alarms
- Valve is removed
  - A loud whooshing sound heard from the tracheostomy tube
- What could cause this?
- Recommendations?



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Listen for Back Pressure

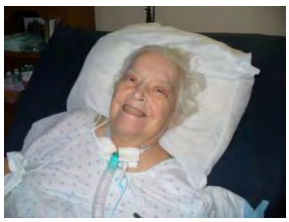
57

Step 6: Adjust the Vent as Necessary

58

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

60

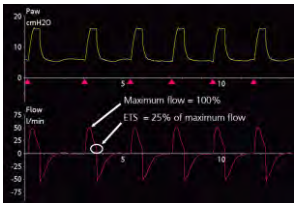
Ventilator Assessment and Adjustments

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

61

Ventilator Assessment and Adjustments

- Pressure Support
  - Exp % sensitivity
  - Inspiratory cycle off
  - Set I-time
- Pressure Control
  - Set I-time



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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

63

Alarm Settings – Safe Practice

- Low exhaled Vt and Ve alarms
- Low pressure alarm
  - Set 5 to 10 cmH_2O below PIP
- High pressure alarm
  - Set 10 cmH_2O above PIP
- High respiratory rate
  - 10 to 15 above baseline

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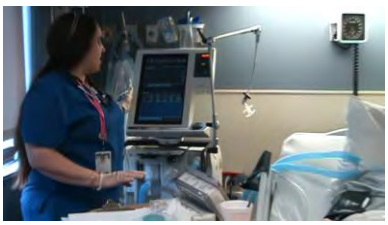
Humidification

- Heat/Moisture Exchanger (HME) is ineffective
- Use with Heated Systems
- Remove PMV for medicated treatments

65

Ventilator Settings and Alarm Management



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Case Study

67

Gil

- Ventilator settings:
  - A/C RR 8
  - V_T 700 cc
  - PIP 35 cmH_2O
  - PEEP 5 cmH_2O
  - F_iO_2 .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 cc
  - PIP 12 cmH_2O
- Patient:
  - Weak cough
  - Voicing
- Should the Valve be placed in-line?

69

Vent Changes Increase Success

- Valve is placed in-line
- Assessment reveals:
  - Whispers only
  - Poor chest expansion
  - Increased RR
- What ventilator change could be made?

70

Vent Changes Increase Success

- Vent change:
  - Increase V_T to meet but not exceed pre-cuff deflation PIP

71

Gil

72

Breakout Sessions:
Ventilator Application and Mock Assessments

73

VITO Demonstration

74

Hands-On: Parts and Pieces

75

Mock Assessments

76

Mock Assessment:
Stacie

77

What would you do next?

78

Stacie

79

What modes of ventilation are compatible with the Valve?

80

Stacie

81

Cuff is deflated without adjusting PEEP. What are your considerations?

82

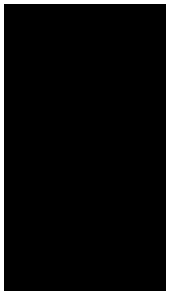
What is the first step in removing the Valve?

83

Stacie

84

Mock Assessment: 2



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What issues did you see?

86

87

What would have been the correct order in removing the Valve?

88

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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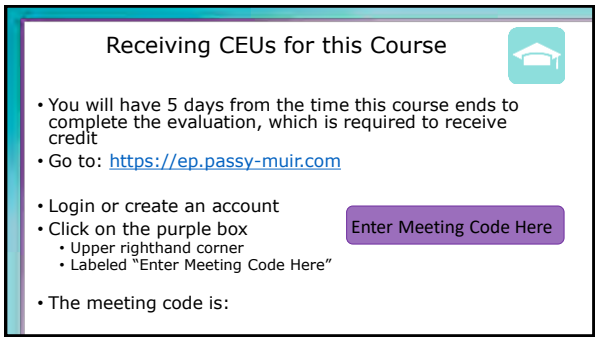
Audience Q&A

90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