Compensation for Changes in Physiology

Rebecca Tribby, RN, MSN Lori Leiser RT



Physiologic Changes Caused by a Tracheostomy

- ◊ Unable to speak
- ◊ Unable to filter the air
- Unable to humidify the
- ◊ air to 100% relative humidity
- Unable to warm the air to core temp 37^o C



Site with more physiology information

tp://www.getbodysmart.com/ap/respiratorysystem

Compensation for Speaking

Decreased or bypassed ability to talk or make noise
 Alternate communication

 sign language
 computer assisted

Compensation for Speaking

- ◇ Speaking valves - one way valve
 - must monitor child when used







Compensation for Filtration Increased risk of foreign body aspiration water art supplies glitter, chalk,



Compensation for Humidification & Warming

◆The mucociliary transport system works at its maximum rate when inspired gases are conditioned to 37°C, 100% Relative Humidity
 ♦ This represents 44 mg water

- vapor per liter of gas
- ◊ If gas is not humidified, the mucociliary system looses moisture & mucus becomes thick
- If temperature lower than core –
- Leads to mucus pooling in the lower airways



Lack of Humidification Airway Patency & Resistance

Pooling of thickened

- decreases patency
- increases resistance

♦ Leads to

- increased work of breathing - increased risk for tube
- obstruction
- increased potential for infection



Lack of Humidification Protection from Pathogens

- Mobile condensate and aerosols can transport pathogens
- Water vapor cannot
- Heated "bubble through" humidifiers produce water vapor



Compensation for Humidification & Warming

- "Bubble-through"/ heated humidifier
 - Large volume jet nebulizer
 - Passive humidifie
 - (HMEs, HCH
 - artificial nose
 - Normal Saline drops

Heated Humidity Needs AC power source - not mobile





HUDSON Concha III® Heated Humidifier with Air Compressor

Fischer & Payke Healthcare® MR850 Humidificati System®

Heated Humidity

Minimum use for children naps and at night

Infants on most of the til





Cool Mist Humidity



∘Compressor with internal battery

Nebulizer cups & normal saline

◇May overheat at 45 minutes

Cool Mist Humidity

◇Provides portability for children who don' t tolerate an artificial pose

Heat Moisture Exchanger (Artificial Nose)

◇Fits on trach tube or in ventilator circuit

 $\diamond \mathsf{Does}$ not work if gets wet







Normal Saline

◇Inefficient means of humidification

 ◊Use as a backup source of humidity

Instill a drop at a time to avoid a cough reflex









