

CPAP

Murila FV

Background

- 20 - 40% of all hospitalizations among children worldwide are due to acute respiratory infections¹
- Pneumonia is the leading cause of death in children worldwide (1.6 million deaths/year) ¹
- *Respiratory Distress Syndrome* (RDS), due to lung immaturity and lack of surfactant in the alveoli, results in collapsing lungs which need pressure to inflate

Background (cont'd)

- Bubble CPAP was developed in the 1970's at Columbia University's Children's Hospital of New York²
- CPAP is used as an aid in treatment of respiratory distress
- Advanced airway management and support is limited in many low- and middle-income countries
- CPAP is a low-tech device which can be used in limited resource settings

Why CPAP?

- Non-invasive:
 - No trauma from intubation
 - Reduction of risk of ventilator associated pneumonia
 - Reduction in ventilator induced lung injury
 - Enhances patient comfort
- Decreases respiratory rate:
 - Research in Ghana showed a reduction in respiratory rate by 16 breaths per minute with the use of CPAP vs. no CPAP₃
- Provides oscillatory pressure:
 - The bubbles created in CPAP produce chest vibrations that may contribute to improved gas exchange

How does CPAP work

- Provides gentle oscillatory pressure
- Pressure travels to alveoli:
 1. “Splints” alveoli and airway open
 2. Improves gas exchange
 3. Decreases work of breathing
 4. Decreases respiratory rate

Mechanics of CPAP- 5 Key Parts

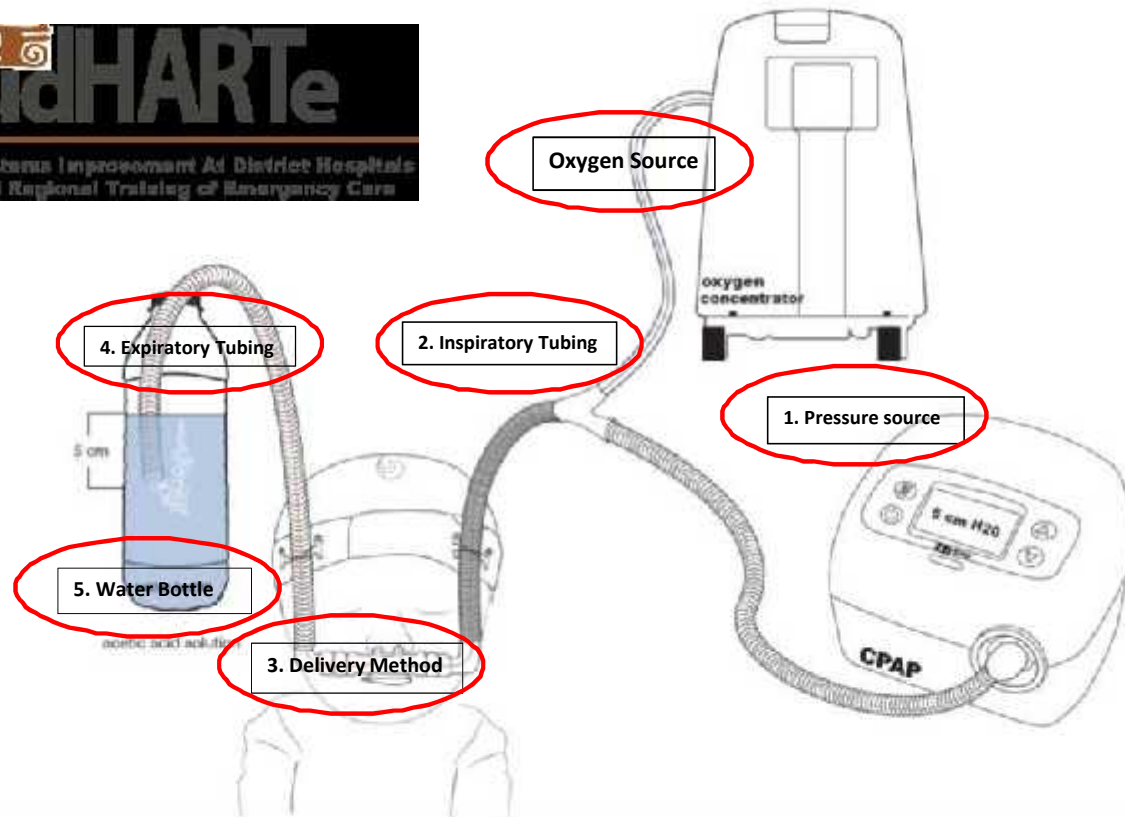
1. Pressure source
2. Inspiratory tubing
3. Expiratory tubing
4. Delivery method (i.e.: Nasal prongs/mask)
5. Water bottle

Additional components:

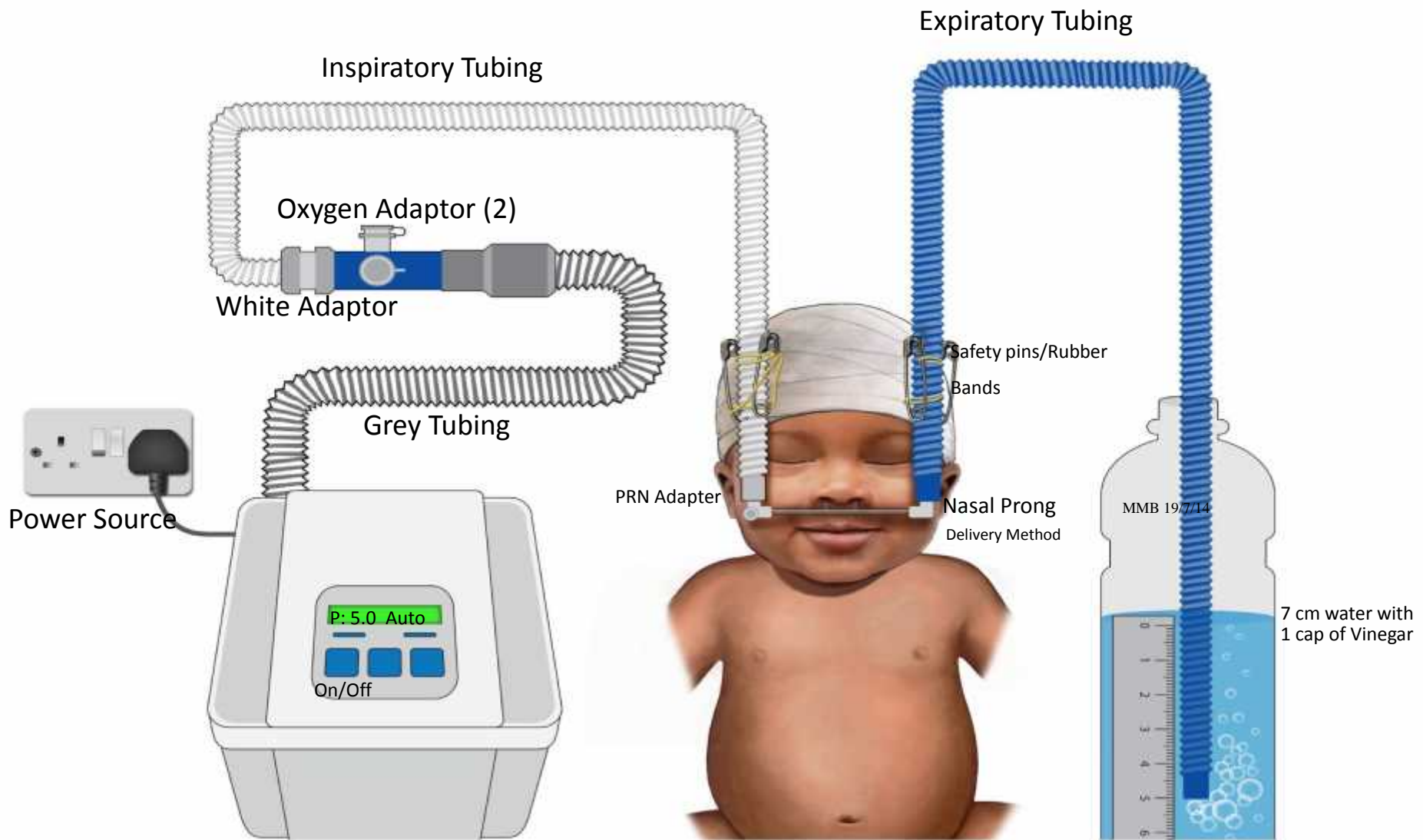
Humidification (dependent on patient needs)

Oxygen Source (dependent on patient needs)

Columbia University mechanics



ben rodriguez



When not to use CPAP

- When patient
- Is **NOT breathing**
- Is unresponsive (coma)
- Is having uncontrolled seizures
- Needs a mechanical ventilator (if available)
- Has had intra-abdominal surgery

When not to use CPAP

When a patient has:

- Nose or facial trauma
- Pneumothorax
- Tracheo-esophageal atresia
- Diaphragmatic hernia
- Severe cardiovascular instability
- Upper airway abnormality
 - Cleft palate/Choanal atresia

Potential complications

1. Gastric distention
2. Vomiting and aspiration
3. Nasal obstruction and dry nose or airway
4. Nasal septal erosion or necrosis
5. Pneumothorax
6. General intolerance & feeding intolerance
7. Trauma
8. Oxygen toxicity

* The majority of the problems can be attributed to inappropriate use, wrong device or a lack of training and experience. Review the set up/application instructions to ensure proper use.

Moh recommendations

Newborns with severe respiratory distress who fulfil the following criteria;

- Weight of > 1000 grams
- APGAR score of ≥ 4 at 5 minutes
- Respiratory distress defined as a Silverman Anderson Score of ≥ 4
- (Note - newborns with a score > 6 should be considered for early referral to a facility capable of offering mechanical ventilation where possible)

Silverman Anderson score

Silverman-Anderson Score			
Feature	Score 0	Score 1	Score 2
Chest Movement	Equal	Respiratory Lag	Seesaw Respiration
Intercostal Retraction	None	Minimal	Marked
Xiphoid Retraction	None	Minimal	Marked
Nasal Flaring	None	Minimal	Marked
Expiratory Grunt	None	Audible w/ stethoscope	Audible
Total Score of 0 indicates no respiratory distress		Total Silverman Score: _____	
Total Score of 4-6 indicates moderate distress			
Total Score of 7-10 indicates severe distress.			

ASANTE