OXYGENATION

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Learning Objectives

- Discuss hypoxemia/hypoxia and poor perfusion
- Review methods to improve oxygenation
- Demonstrate the use of various oxygen therapy modalities (nasal cannula, non-rebreather mask, venturi mask)

What is perfusion?

- Passage of fluid through the circulatory system or lymphatic system to an organ or a tissue
  - usually referring to the delivery of blood to the tissue

What is poor perfusion?

- A decreased oxygen level in the blood
  - _____ can be used to assess oxygen level
    - SpO_2 – measure of how saturated hemoglobin are with oxygen (measured with pulse oximetry)
      - 95-100%

Signs/Symptoms of Poor Perfusion

Restlessness/confusion
Decreased blood pressure
Cool extremities
Pallor or cyanosis of extremities
Slow capillary refull

When oxygen delivery is inadequate to meet metabolic demands of the body = tissue ischemia and cell death

Hypoxia (low oxygen in your tissues) when your ***blood*** doesn't carry enough oxygen to the tissues to meet the body's needs

Interventions Prior to Oxygen Use

- Promotion of lung expansion
  - Position changes frequently – every 2 hours
  - Keep upright
  - Increase daily activities; ensure adequate hydration
  - Coughing exercises
  - Deep breathing (IS)
- Post Operative
  - IS
  - TCDB
  - Splinting incision

Albuterol (ProAir) MDI

- Bronchodilator
  - Rescue inhaler for acute difficulty breathing (asthma, COPD)
  - Beta 2 agonist (SABAs)Short-Acting Beta Agonist
    - Stimulates beta-2 adrenergic receptors, relaxing airway smooth muscle
    - Two puffs inhaled every 4 to 6 hours prn bronchospasm/difficulty breathing
    - May take 2 puffs 5-30 minutes before exercise
    - Common reactions
      - Nervousness, tachycardia, headache, throat irritation

Symbicort (budesonide/formeterol inhaled)

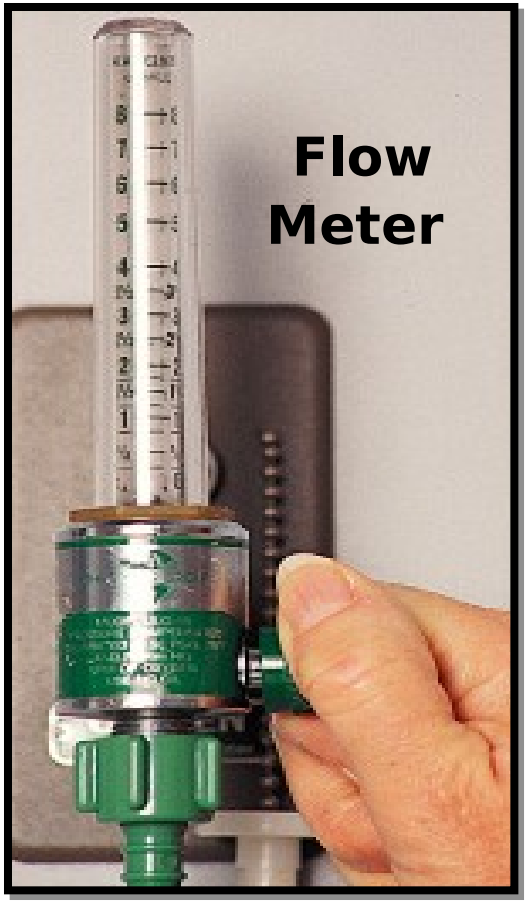
- Corticosteroid/Bronchodilator
  - Beta 2 agonist (LABA) Long-Acting Beta Agonist
  - MDI: 80mcg/4.5mcg; 160/4.5 mcg
    - Two puffs bid (2 times/day)
    - Treatment for prevention of asthma attacks and exercise-induced bronchospasm and COPD
    - Common Reactions
      - Tachycardia, nervousness, palpitations, oral candidiasis

Abnormal Respiratory Patterns

- Tachypnea – rapid rate
- Bradypnea – slow rate
- Apnea – cessation of breathing

Assessing Patients on Oxygen Therapy

- Equipment
- Correct oxygen delivery device
- Flow rate is correct
- Respiratory assessment
  - *vital signs*
  - *oxygen saturation*
  - *Level of consciousness, any s/s of hypoxia*
  - *skin*


Flow
Meter


OXYGEN
MEDICAL AIR
Xmas
Tree

Fraction of Inspired Oxygen (FIO2)

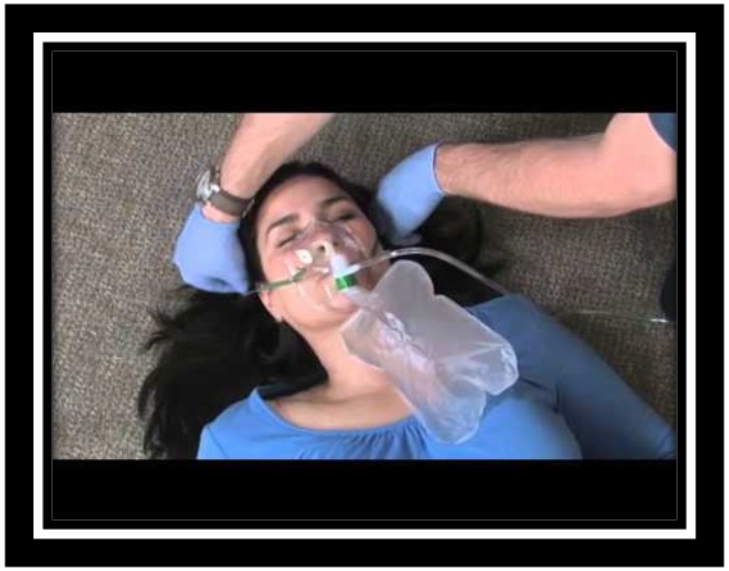
- FIO_2 is percent of oxygen a person is inhaling
- Room air FIO_2 is 21%
- With supplemental oxygen, FIO_2 can reach 100%

Methods of Oxygen Delivery
Nasal Cannula

- Oxygen delivery
  - up to 6L/min. **(usually no more than 4)**
  - FIO_2 24%-44%
- Advantages
  - safe & simple, easily tolerated
  - increased mobility

Disadvantages
  - dries membranes; skin breakdo

Non-Rebreather Mask



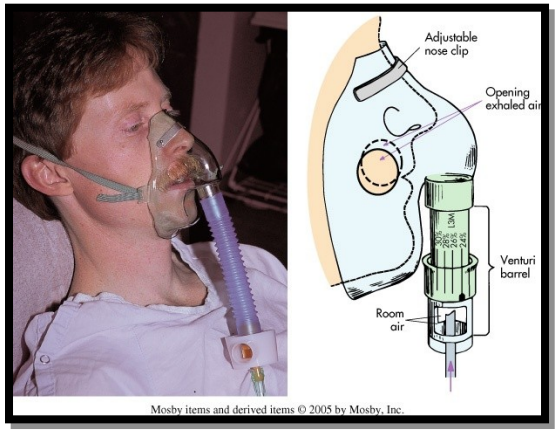
Face mask with reservoir Bag & one-way valves at inlet port & on exhalation ports on mask; one-way valve closes during exhalation

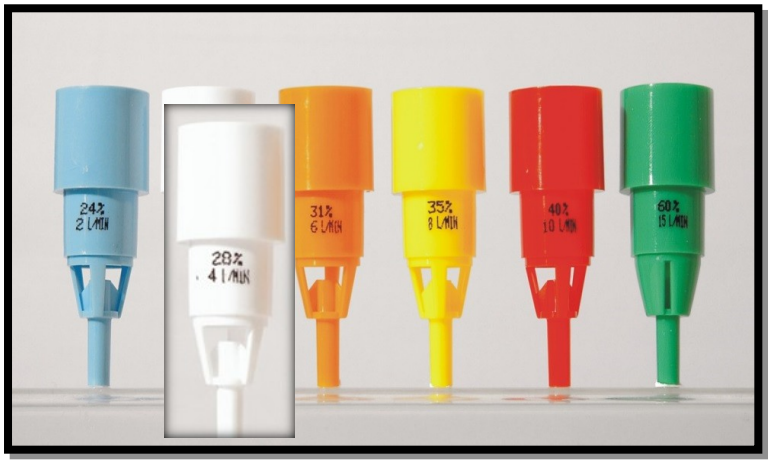
FIO2 of 60-100%

Set flow meter @ 10-15 L for 100%

Delivers higher concentrations of oxygen
Treat hypoxia, ↓workload of breathing

Venturi Mask





Advantages

- controls exact concentration of oxygen
- delivers FIO_2 of 24-60% flow rates from 4-12 L/min

Disadvantages

- Hot & confining
- Interferes with eating & talking

Commonly used in COPD patients

Face Tent

Advantages

- delivers 28-100% with flow rate of 8-12L/min

alternative for claustrophobia

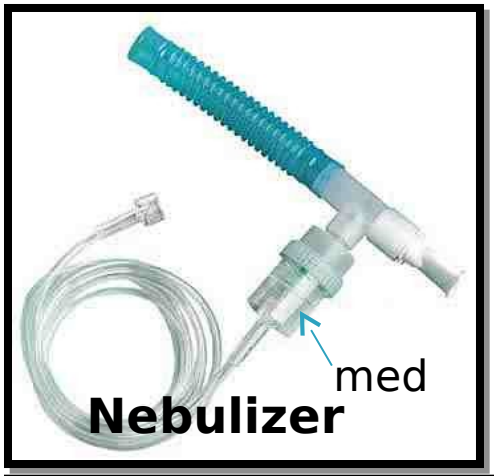
Disadvantages

- Difficult to control concentration of oxygen

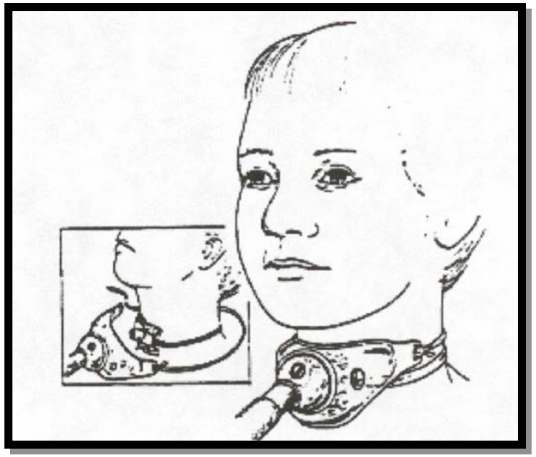
Documentation

- Date & time oxygen initiated
- Method of delivery
- Flow rate in liters per minute
- Patient response to oxygen
- Condition of pt’s skin where device rests
- Respiratory assessment
- Patient/family teaching

Humidification



Nebulizer



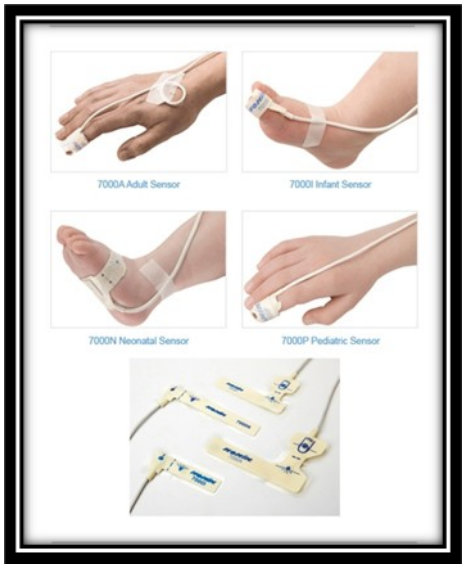
T Tube

Bag-Valve Mask

Trach mask

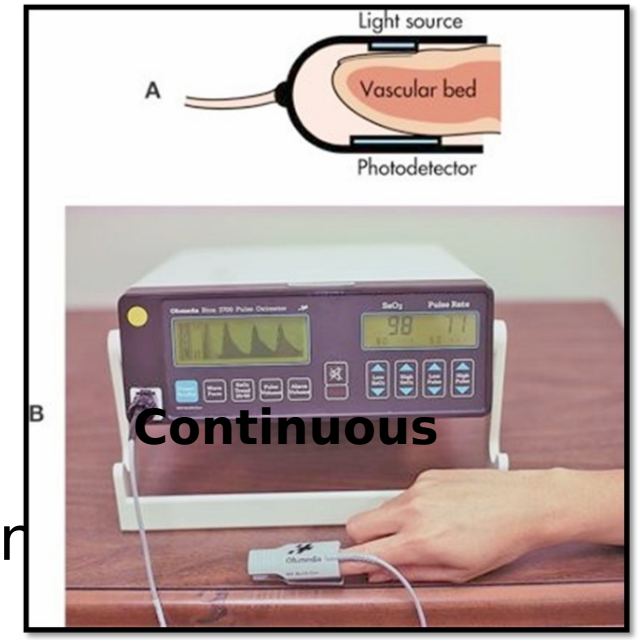
Pulse Oximetry

- A procedure use to measure the oxygen level in the blood.
- Non-invasive, painless
- Indicator of 0_2



Factors that Alter Accuracy Of Pulse Ox

- Physical
  - motion/incorrect placement
  - BP monitoring device
  - bright lights, polish, acrylics
- Physiological
  - poor arterial flow or edema
  - cold hands; poor capillary fillin
  - anemia



Incentive Spirometry (IS)

- **Purpose**
  - helps prevent post-op pulmonary complications (atelectasis)
  - provides voluntary deep breathing
  - gives visual feedback
- **Technique**
  - explain procedure
  - positioning
- **Frequency**
- Nursing considerations

Oxygen Safety

- Do not smoke
- Do not use aerosol sprays
- Do not use any petroleum products
- Should be administered to patient by physician order or in judgment of RN in emergency situations

Oxygen Toxicity

- Oxygen toxicity can develop when a person breathes 100% oxygen for ˃ 12 hours
- Results from effects on CNS and Pulmonary Systems
- Signs/Symptoms
  - Pallor, sweating, nausea & vomiting
  - Seizures, vertigo, muscle twitching
  - Hallucinations, visual changes, anxiety
  - Chest pain, dyspnea