



From Potter, P.A. & Perry, A.G. (2009). *Fundamentals of Nursing*. 7th Ed. St. Louis: Mosby.

* Care of Patients Requiring Oxygen Therapy or Tracheostomy



Why Do We Need Oxygen?

- * Essential for life and function of cells/tissues.
- * Respiratory, cardiovascular, hematologic systems work together, providing sufficient tissue perfusion to the body.
- * Oxygen therapy improves oxygenation and tissue perfusion.

* Clinical Manifestations of Respiratory Distress

- * Dyspnea
- * Nasal flaring
- * Use of accessory muscles to breathe
- * Pursed-lip or diaphragmatic breathing
- * Decreased endurance
- * Skin, mucous membrane changes (pallor, cyanosis)



Respiratory Assessment

- * Don't forget the order of assessment!
 - * Nose and sinuses
 - * Pharynx, trachea, larynx
 - * Lungs and thorax
 - * Rate/rhythm/depth of respirations
 - * Movement /symmetry
 - * Shape
 - * Breath sounds
 - * General appearance (muscle development)
 - * Skin and mucous membranes

* Assessment of Oxygenation

Arterial Blood Gas (ABG) Lab Analysis

TEST	RANGE	RESULT	UNIT
ABG:			
pH	(7.35 - 7.45)	7.38	pH
PaCO ₂	(35.0 - 45.0)	38.0	mm/Hg
PO ₂	(35.0 - 46.0)	39.0	mm/Hg
HCO ₃	(22.0 - 26.0)	25.0	mmol/L

* ABG analysis is best way to determine need for oxygen therapy



Oxygen Therapy

- * Purpose—relieves hypoxemia
 - * **Hypoxemia**—low levels of oxygen in the blood.
 - * **Hypoxia**—decreased tissue oxygenation.
- * **Goal**—use lowest fraction of inspired oxygen for acceptable blood oxygen level without causing harmful side effects.



Oxygen Delivery Systems

* Type used depends on:

- * Oxygen concentration required/achieved
- * Importance of accuracy and control of oxygen concentration
- * Patient comfort
- * Importance of humidity
- * Patient mobility

* Low-Flow Oxygen Delivery Systems

- * Nasal cannula (1-6 L)
- * Simple Facemask (5-8 L)
- * Partial Rebreather Mask (6-11 L)
- * Non-Rebreather Mask



Nasal Cannula

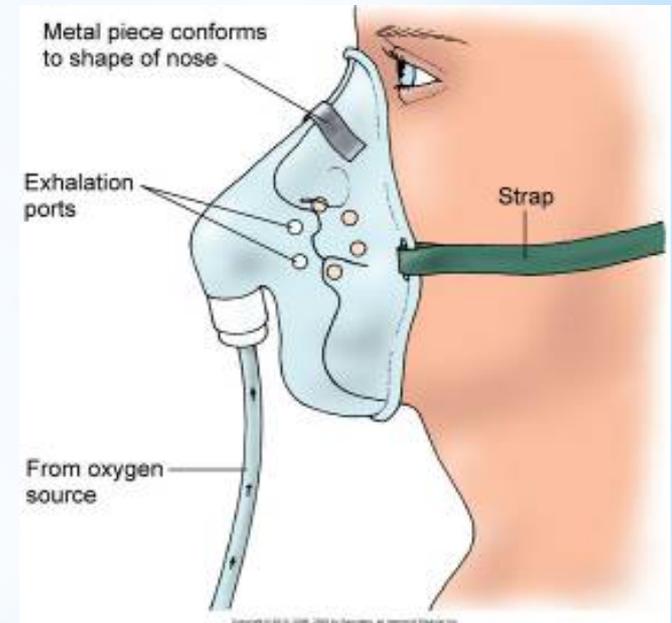
- * Flow rates of 1-6 L/min
- * O₂ concentration of 24%-44% (1-6 L/min)
- * Flow rate >6 L/min does not increase O₂ because anatomical dead space is full
- * Assess patency of nostrils
- * Assess for changes in respiratory rate and depth





Simple Facemask

- * Delivers O₂ up to 40%-60%
- * Minimum of 5 L/min
- * Mask fits securely over nose and mouth
- * Monitor closely for risk of aspiration



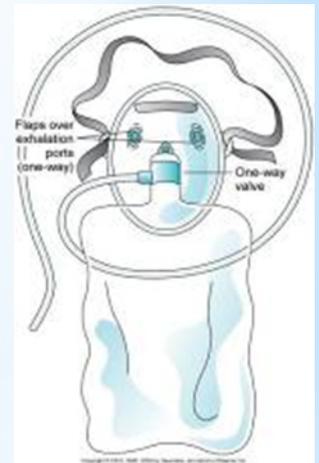
* Partial and Non Rebreather Mask

Partial

- * 60-75% FiO₂
- * Has a reservoir bag without flaps.
- * Each breath the patient Rebreaths 1/3 the tidal volume that is high in oxygen.
- * Be sure the bag remains slightly inflated.

Non

- * Up to 90% FiO₂
- * Use in unstable patients that may need intubation.
- * Has a reservoir bag with flaps so patient gets all the oxygen and any room air that can dilute oxygen concentration.
- * Ensure valves are patent and functional.





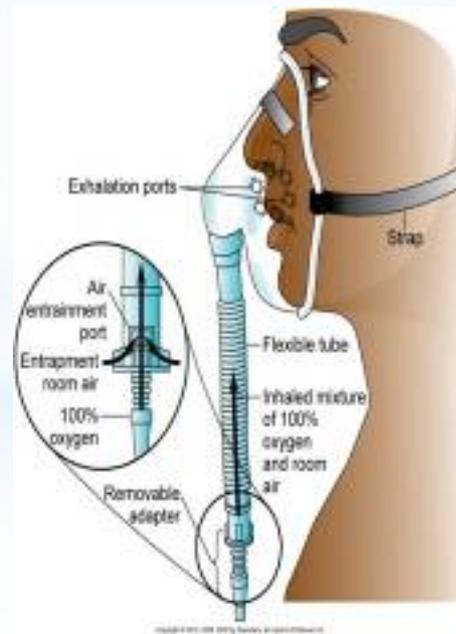
High-Flow Oxygen Delivery Systems

- * Venturi mask
- * Face tent
- * Aerosol mask
- * Tracheostomy collar
- * T-piece



Venturi Mask

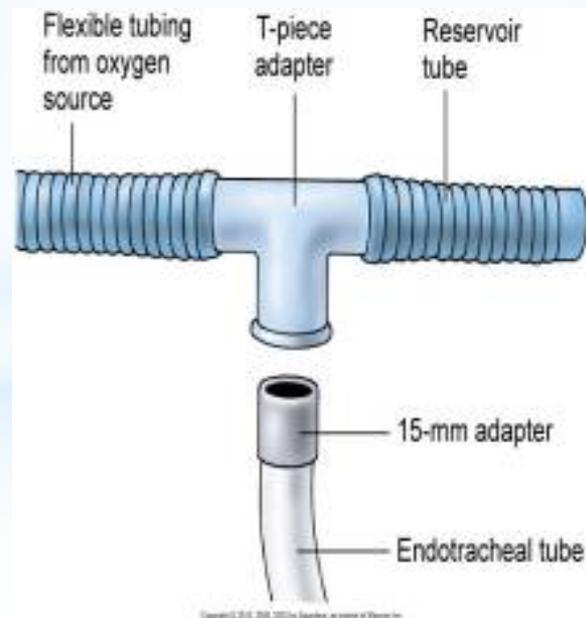
- * Adaptor located between bottom of mask and O₂ sources
- * Delivers precise O₂ concentration—best source for chronic lung disease
- * Switch to nasal cannula during mealtimes





T-Piece

- * Delivers desired FIO_2 for tracheostomy, laryngectomy, ET tubes
- * Ensures humidifier creates enough mist
- * Mist should be seen during inspiration and expiration



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Noninvasive Positive-Pressure Ventilation (NPPV)

- * Uses positive pressure to keep alveoli open, improve gas exchange without airway intubation.
 - * BiPAP
 - * CPAP

* Continuous Positive Airway Pressure (CPAP)





CPAP (cont'd)

- * Delivers set positive airway pressure throughout each cycle of inhalation and exhalation.
- * Opens collapsed alveoli and keeps open.
- * Used for atelectasis after surgery or cardiac-induced pulmonary edema; sleep apnea.
- * Goal: prevent the airways from collapsing.



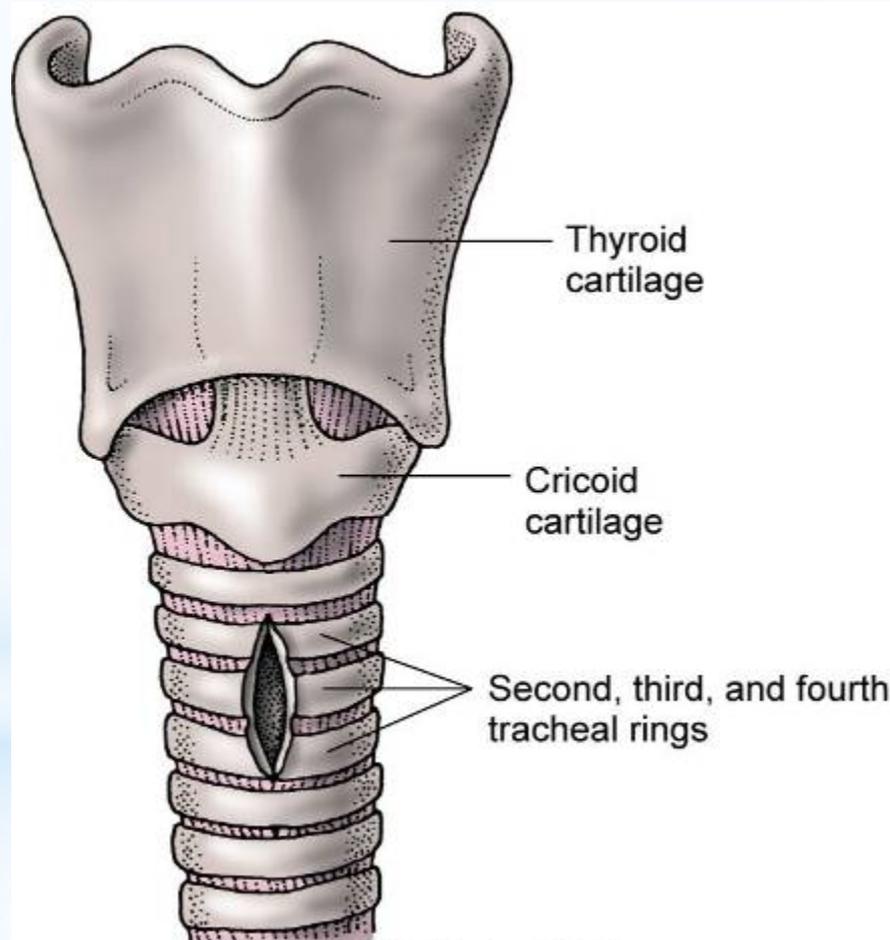
Tracheostomy

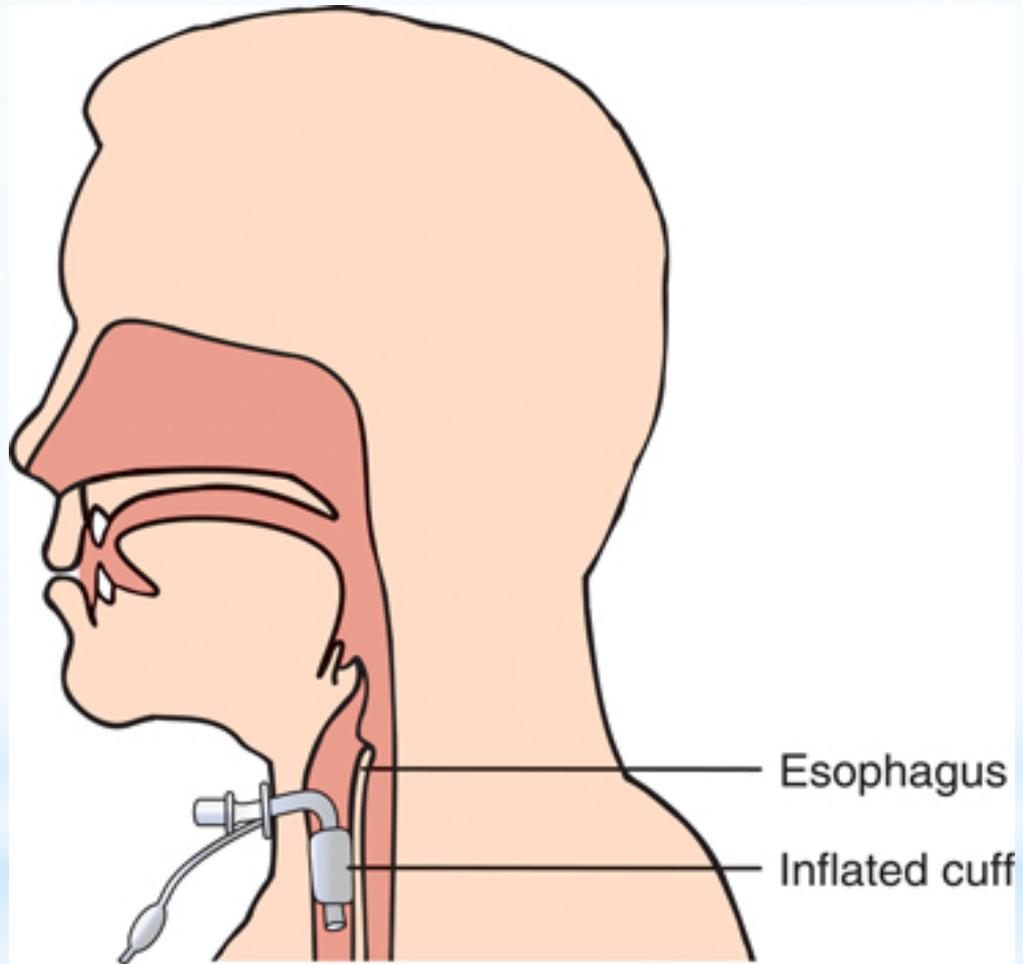
- * **Tracheotomy**—surgical incision into trachea for purpose of establishing an airway.
- * **Tracheostomy**—stoma (opening) that results from tracheotomy
 - * May be temporary or permanent.
 - * Permanent tracheostomy is required for certain diseases such as laryngeal cancer.

Primary nursing responsibility is to maintain a patent airway



Tracheostomy (cont'd)





Esophagus

Inflated cuff



Trach/Shiley

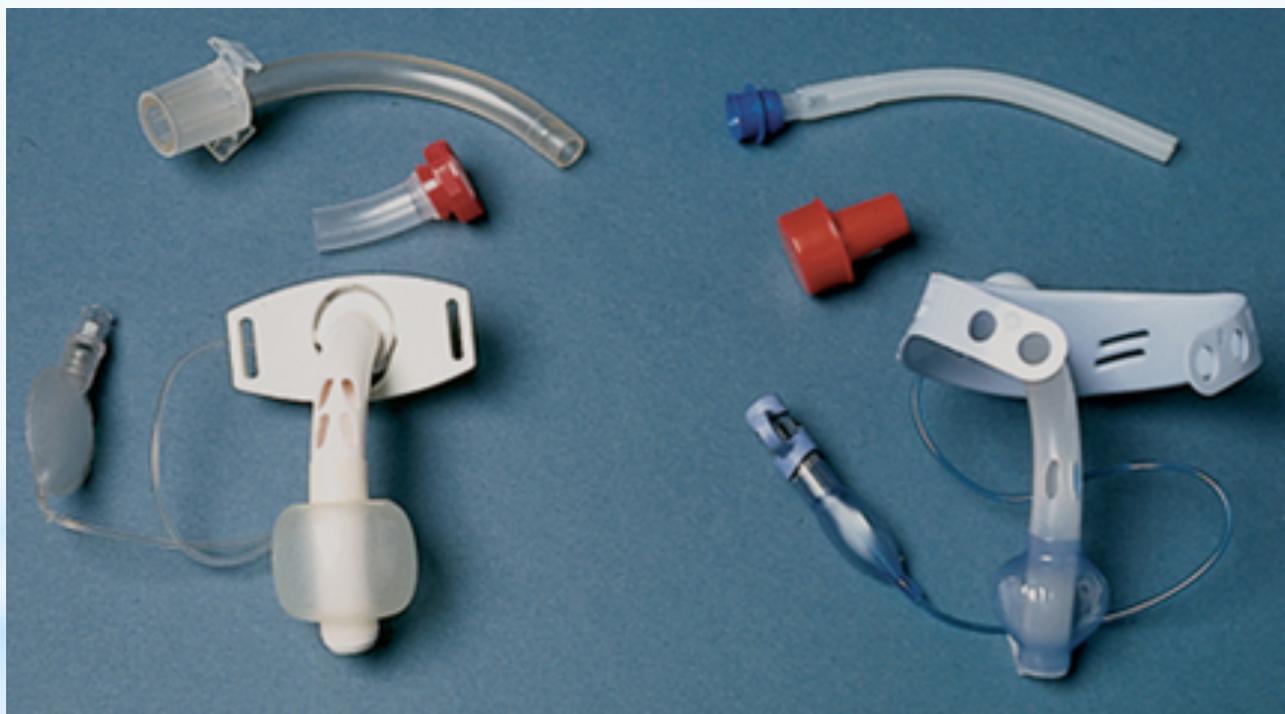
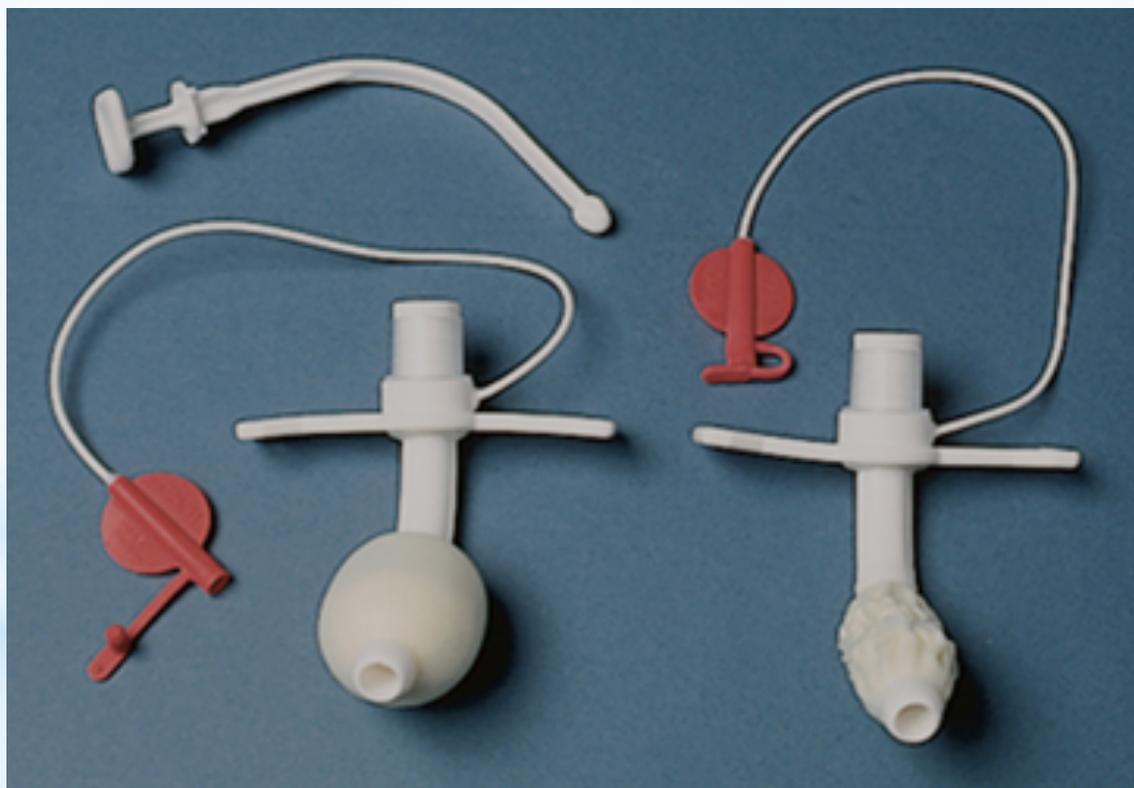




Figure 13-8, C





Cuff Pressures





David A. Muir

Passy-Muir® Valve Inventor
1962 – 1990





Priority Patient Problems

- * Reduced oxygenation
- * Inadequate communication
- * Inadequate nutrition
- * Potential for infection
- * Damaged oral mucosa



Tracheostomy Tubes

- * Disposable or reusable.
- * Cuffed tube or tube without cuff for airway maintenance.
- * Inner cannula disposable or reusable.
- * Fenestrated tube.



Care Issues for the Patient with a Tracheostomy

- * Prevention of tissue damage:
 - * Cuff pressure can cause mucosal ischemia.
 - * Use minimal leak and occlusive techniques.
 - * Check cuff pressure often.
 - * Prevent tube friction and movement.
 - * Prevent/treat malnutrition, hemodynamic instability, hypoxia.

* Air Warming and Humidification

- * Tracheostomy tube bypasses nose and mouth, which normally humidify, warm, and filter air.
- * Air must be humidified
- * Maintain proper temperature.
- * Ensure adequate hydration.



Suctioning

- * Maintains patent airway, promotes gas exchange.
- * Assess the need in patients who cannot cough adequately.
- * Done through nose or mouth.



Complications of Suctioning

- * Hypoxia
- * Tissue (mucosal) trauma
- * Infection
- * Vagal stimulation, bronchospasm
- * Cardiac dysrhythmias from induced hypoxia



Causes of Hypoxia in the Tracheostomy

- * Ineffective oxygenation before, during, after suctioning.
- * Use of catheter that is too large for the artificial airway.
- * Prolonged suctioning time
- * Excessive suction pressure
- * Too frequent suctioning



Tracheostomy Care

- * Assess the patient
- * Secure tracheostomy tubes in place
- * Prevent accidental decannulation



Bronchial and Oral Hygiene

- * Turn/reposition every 1 to 2 hours, support out-of-bed activities, encourage early ambulation.
- * Coughing and deep breathing, chest percussion, vibration, and postural drainage promote pulmonary cure.
- * Avoid glycerin swabs or mouthwash containing alcohol for oral care; assess for ulcers, bacterial/fungal growth, infection.

Passy Muir Valve

- * Weaning—gradual decrease in tube size; ultimate removal of tube.
- * Change from cuffed to uncuffed tube.
- * Size of tube decreased by capping; use smaller fenestrated tube.



Weaning from a Tracheostomy Tube

* In a case of extreme medical emergency (i.e., severe oxygen desaturation, respiratory failure, or respiratory or cardiac arrest), oxygen can be delivered at full flow (> 10 L/min.) with an Ambu Bag using a face mask or fitted directly onto a tracheostomy cannula.



Ambu Bag