Oxygenation

Oxygen is essential for sustaining life. Each cell of the human body uses oxygen to metabolize nutrients and produce energy. Without oxygen, cell death occurs rapidly.

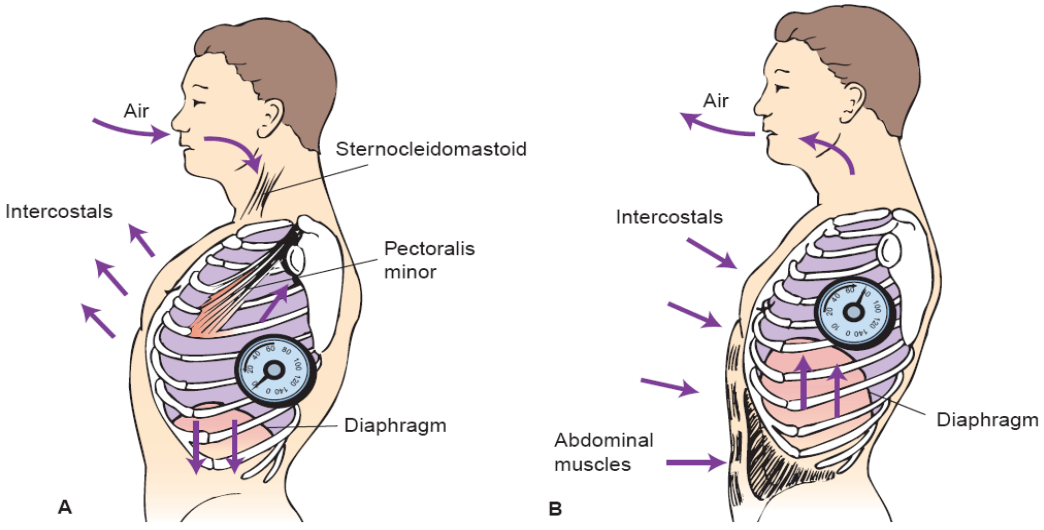
Anatomy and Physiology of Breathing

- Lung tissue elasticity allows lungs to stretch & fill with air during **inspiration** (breathing in) & return to resting position after **expiration** (breathing out).
- **Ventilation** (air movement in & out of the lungs) facilitates **respiration**.
- **External respiration** takes place between ***alveolar–capillary membranes.***
- **Internal respiration** occurs at ***cellular level*** by means of ***Hb & body cells***.
- Increased CO_2 & H^+ in blood stimulate breathing ***chemically*** & ***neurologically***.
- Ventilation results from ***pressure changes*** within ***thoracic cavity*** produced by the ***contraction & relaxation of respiratory muscles***.

During inspiration, ***diaphragm contracts*** & ***moves downward*** in the thorax.

- The **intercostal** muscles move the chest ***outward*** by elevating ribs & sternum. This combination expands the thoracic cavity.
- **Expansion** creates more chest space, pressure within lungs fall below that in atmosphere.
- **Air is pulled in** through the nose, ***filling the lungs.***
- When acute need for, **accessory muscles** (***pectoralis minor*** & ***sterno-cleido-mastoid***) contract to assist with greater chest expansion.

During expiration, respiratory muscles relax, thoracic cavity ↓, stretched elastic lung tissue ***recoils***, intrathoracic pressure increases & air moves out



Ventilation and thoracic pressure changes

(*A*) Inspiration (*B*) Expiration.

Assessing Oxygenation

The nurse can determine the quality of a client's oxygenation by:

- Collecting ***physical assessment data***,
- Monitoring ***arterial blood gases***, and

- Using ***pulse oximetry***.

A combination of these helps to identify signs of **hypoxemia** (insufficient oxygen within arterial blood) and **hypoxia** (inadequate oxygen at the cellular level).

Physical Assessment oxygenation

- Monitor respiratory rate, observe breathing pattern & effort
- Check chest symmetry, and auscultate lung sounds
- Record heart rate & blood pressure, level of consciousness
- Observe color of skin, mucous membranes, lips, and nailbeds

Common Signs of Inadequate Oxygenation

- Decreased energy; Restlessness
- Rapid, shallow breathing
- Rapid heart rate
- Sitting up to breathe
- Nasal flaring
- Use of accessory muscles
- Hypertension
- Sleepiness, confusion, stupor, coma
- Cyanosis of skin (mucous membranes in dark-skinned patients), lips & nailbeds

Arterial Blood Gases (ABG)

- ABG is using arterial blood to **assess *oxygenation***, ***ventilation*** & ***acid–base balance***. It **measures *partial pressure of O_2*** (PaO_2), ***Hb saturated with oxygen*** (SaO_2), ***partial pressure of CO_2*** ($PaCO_2$), ***blood pH***, & ***level of bicarbonate*** (HCO_3) ions.
- Arterial blood is preferred for sampling because **arteries have greater oxygen content than veins** and are responsible for **carrying oxygen** to all cells.
- ABGs ordered to assess client in ***acute respiratory distress*** or to ***evaluate progress***.
- Mostly, a laboratory technician & nurse collaboratively collect arterial blood

Values for arterial blood gases			
Component	Normal range	Abnormal findings	Indication of abnormal findings
pH	7.35–7.45	<7.35 >7.45	Acidosis Alkalosis
PaO2	80–100 mm Hg	60–80 mm Hg 40–60 mm Hg <40 mm Hg >100 mm Hg	Mild hypoxemia Moderate hypoxemia Severe hypoxemia Hyperoxygenation
PaCO2	35–45 mm Hg	<35 mm Hg >45 mm Hg	Hyperventilation Hypoventilation
SaO2	95–100%	<95%	Hypoventilation; Anemia
HCO3	22–26 mEq	<22 or >26 mEq	Compensation for acid–base imbalance

Pulse Oximetry

- It is noninvasive, transcutaneous technique for monitoring O_2 saturation of blood.
- A pulse oximeter is composed of a sensor & a microprocessor.
- It is attached to a ***finger***, ***toe***, ***earlobe***, or ***nose bridge***.
- The pulse oximetry O_2 saturation is recorded as SpO_2 (SaO2 obtained from ABG).
- The normal SpO_2 is 95% to 100%.
- A sustained level of less than 90% is cause for concern.
- If the SpO_2 remains low, the client needs oxygen therapy.

PROMOTING OXYGENATION

Positioning & **teaching breathing techniques** are used to promote oxygenation. **Adhesive nasal strips** used to improve oxygenation by reduce airway resistance & improve ventilation.

Positioning

- **Fowler's position**, unless contraindicated, is recommended for clients with hypoxia.
- It eases breathing by allowing abdominal organs to descend away from diaphragm.
- As a result, the lungs have the potential to fill with a greater volume of air.
- **Orthopneic position** is a seated position with arms supported on pillows or rests of a chair, and the client leans forward over the bedside table or a chair back.
- It allows room for maximum vertical and lateral chest expansion and provides comfort while resting or sleeping.

Breathing Techniques

Breathing techniques as **deep breathing** with or without an **incentive spirometer**, **pursed-lip breathing** & **diaphragmatic breathing** help clients to breathe more efficiently.

Deep Breathing

- Deep breathing is a technique for maximizing ventilation.
- Taking in a large volume of air fills alveoli to a greater capacity.
- It is used for clients who breathe shallowly as those who are (inactive or in pain).
- Teach client to take in as much air as possible, hold breath briefly and exhale slowly.
- In some cases it is helpful to use an incentive spirometer.

Incentive spirometry: is a technique for **deep breathing** using a **calibrated device**, encourages clients to reach a goal-directed volume of inspired air.

All spirometers **are marked in 100-milliliter increments**. The calibrated measurement helps the nurse to evaluate effectiveness of the client's breathing efforts.

Pursed-Lip Breathing

It is a form of controlled ventilation in which client consciously **prolongs the expiration**. It improves **gas exchang**e, helps to **eliminate more amount of CO_2** from the lungs. Pursed-lip breathing and diaphragmatic breathing are helpful for clients who have **chronic lung diseases** such as **emphysema**.

The client performs pursed-lip breathing as follows:

- Inhale slowly through the nose while counting to three.
- Purse the lips as though to whistle.
- Contract the abdominal muscles.
- Exhale through pursed lips for a count of six or more.

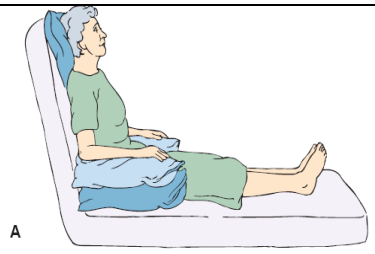
Expiration should be **two to three times longer than inspira**tion.

Diaphragmatic Breathing

- **Diaphragmatic breathing** is breathing that promotes the use of the diaphragm rather than the upper chest muscles.
- It is used to increase the volume of air exchanged during inspiration and expiration.
- It reduces respiratory effort and relieves rapid, ineffective breathing.

Nasal Strips

- Adhesive nasal strips used to reduce airflow resistance by widening the breathing passageways of the nose.
- Increasing the nasal diameter promotes easier breathing.
- Common users of nasal strips are people with ineffective breathing as well as athletes, whose oxygen requirements increase during sustained exercise.
- Another use for nasal strips is to reduce or eliminate snoring.

	
(*A*) Orthopneic position.	(*B*) Alternative orthopneic position.

Oxygen Therapy (OT)

OT is an intervention for administering more O_2 than present in the atmosphere. It requires **O_2 source**, **flow meter**, **O_2 analyzer** or **humidifier** & **O_2 delivery device**.

Oxygen Sources

O_2 is supplied from **wall outlet**, **portable tank**, **liquid O_2 unit**, or **O_2 concentrator**.

Wall Outlet

Most health care facilities supply oxygen through a wall outlet in client's room. The outlet is connected to a large central reservoir filled with oxygen on a routine basis.

Portable Tanks

- A large tank of oxygen contains 2,000 lbs of pressure per square inch.
- The tanks are delivered with a protective cap.
- The oxygen tanks are transported and stored while strapped to a wheeled carrier.
- Before oxygen is administered, tank is "**cracked**" a technique for clearing the outlet of dust and debris.

Liquid Oxygen Unit

- A **liquid oxygen unit** is a device that converts cooled liquid O_2 to a gas.
- Ambulatory clients at home use these portable units. Each unit holds approximately 4 to 8 hours worth of oxygen.
- Potential problems include that liquid oxygen is more expensive, the unit may leak during warm weather, and frozen moisture may occlude the outlet.

Oxygen Concentrator

It is a machine that collects & concentrates O_2 from room air & stores it for client use.

Equipment Used in Oxygen Administration

In addition to an oxygen source, other pieces of equipment used during the administration of oxygen are a **flowmeter**, **oxygen analyzer**, and **humidifier**.

Flowmeter

- A **flowmeter** is a gauge used to regulate the amount of oxygen delivered to the client and is attached to the oxygen source.
- The flow of oxygen is measured in liters per minute (L/min).
- The physician prescribes the concentration of oxygen, also called the **fraction of inspired oxygen** (FIO_2; the portion of oxygen in relation to total inspired gas), as a percentage or as a decimal (for example, 40% or 0.40).
- The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) recommends that oxygen be prescribed as a percentage rather than in L/min.

Oxygen Analyzer

An **oxygen analyzer** is a device that measures the percentage of delivered oxygen to determine if the client is receiving the amount prescribed by the physician. If there is a normal mixture of O_2 and other gases in the environment, it indicates 0.21 (21%).	

Humidifier

- A **humidifier** is a device that produces small water droplets because oxygen is drying to the mucous membranes. In most cases, oxygen is humidified only when more than 4 L/min is administered for an extended period. When humidification is desired, a bottle is filled with distilled water and attached to the flowmeter.

Common Delivery Devices

Common oxygen delivery devices include a **nasal cannula**, **masks**, **face tent**, **tracheostomy collar**, or **T-piece**. The device prescribed depends on the client's oxygenation status, physical condition, and amount of oxygen needed.

Nasal Cannula

A **nasal cannula** is a hollow tube with half-inch prongs placed into the client's nostrils. It is held in place by wrapping the tubing around the ears and adjusting the fit beneath the chin. It provides a means of administering low concentrations of oxygen.

Masks

It includes **simple mask**, **partial rebreather mask**, **non-rebreather mask,** or **Venturi mask**.

SIMPLE MASK

- It fits over the nose and mouth and allows atmospheric air to enter and exit.
- An elastic strap holds it in place. It allows the administration of higher levels of oxygen. When a simple mask is used, O_2 is delivered at no less than 5 L/min.
- It interferes with eating and make verbal communication difficult to understand.
- Skin care; because masks create pressure and trap moisture.

PARTIAL REBREATHER MASK

- It is an oxygen delivery device through which a client inhales a mixture of atmospheric air, oxygen from its source, and O_2 contained within a reservoir bag.
- It provides a means for recycling oxygen and venting all the carbon dioxide during expiration from the mask.

NON-REBREATHER MASK

- It is an oxygen delivery device in which *all* the exhaled air leaves the mask. It is designed to deliver an FIO_2 of 90% to 100%.
- It contains one-way valves that allow only oxygen to be inhaled.

VENTURI MASK

- It mixes a precise amount of oxygen and atmospheric air. Adapters within the tube, which are color-coded or regulated by a dial system, permit only specific amounts of room air to mix with the oxygen. The Venturi mask delivers the exact amount of prescribed oxygen. Humidification can be added when a Venturi mask is used.

Face Tent

- A **face tent** provides oxygen to the nose and mouth without the discomfort of a mask. An added advantage is that a face mask can be used for clients with facial trauma or burns. **A disadvantage** is that the amount of oxygen clients actually receive may be **inconsistent** with what is prescribed.

Tracheostomy Collar

- It delivers oxygen near an artificial opening in the neck. It is applied over a tracheostomy, an opening into the trachea through which a client breathes.

T-Pie e

- It fits securely onto a tracheostomy tube or endotracheal tube. It is similar to a tracheostomy collar but is attached directly to the artificial airway. **Disadvantage:** The

moisture collects within tubing **condense & may enter airway** during position changes. Also weight of the T-piece, may pull on tracheostomy tube, causing client to cough or experience discomfort.

Administering Oxygen Safely

- Post "Oxygen in Use" signs wherever oxygen is stored or in use.
- Prohibit the burning of candles during religious rites.
- Check that electrical devices have a three-pronged plug.
- Inspect electrical equipment for frayed wires or loose connections.
- Avoid using petroleum products, aerosol products (such as hair spray), and products containing acetone (as nail polish remover) where oxygen is used.
- Secure portable oxygen cylinders to rigid stands.

Oxygen Hazards

Fire Potential

Oxygen itself does not burn, but it contributes to burning process. Therefore, it is necessary to control all possible sources of open flames or ungrounded electricity.

Oxygen Toxicity

Oxygen **toxicity** means lung damage that develops when oxygen concentrations of more than 50%are administered for longer than 48 to 72 hours. The exact mechanism by which hyperoxygenation damages the lungs is not definitely known. One theory is that it reduces **surfactant,** which is a lipoprotein produced by cells in the alveoli that promotes elasticity of the lungs and enhances gas diffusion.

RELATED OXYGENATION TECHNIQUES

Water-Seal Chest Tube Drainage

It is a technique for evacuating air or blood from the pleural cavity, which helps to restore negative intrapleural pressure and re-inflate the lung.

• One chamber collects blood or acts as an exit route for pleural air.

• A second compartment holds water that prevents atmospheric air from re-entering the pleural space (hence the term "water seal").

• A third chamber, if used, facilitates the use of suction, which may speed the evacuation of blood or air. One of the most important principles when caring for clients with water-seal drainage is that the chest tube must never be separated from the drainage system unless it is clamped. Even then, the tube is clamped for a brief time.

Signs and Symptoms of Oxygen Toxicity	
❁ Non-productive cough	❁ Fatigue
❁ Nasal stuffiness	❁ Hypoventilation
❁ Substernal chest pain	❁ Headache
❁ Nausea and vomiting	❁ Sore throat

Hyperbaric Oxygen Therapy (HBOT)

Hyperbaric oxygen therapy consists of the delivery of 100% oxygen at three times the normal atmospheric pressure within an airtight chamber. Treatments, which last approximately 90 minutes, are repeated over days, weeks, or months of therapy. Providing pressurized oxygen increases the oxygenation of blood plasma from a normal level of 80 to 100 mm Hg to more than 2,000 mm Hg. providing clients with brief periods of breathing room air helps to prevent oxygen toxicity. HBOT helps to regenerate new tissue at a faster rate; thus, its most popular use is for promoting wound healing. It also is used to treat carbon monoxide poisoning, gangrene associated with diabetes or other conditions of vascular insufficiency, decompression sickness experienced by deep-sea divers, anaerobic infections (especially in burn clients), and several other medical conditions.

NURSING IMPLICATIONS

Nurses assess the oxygenation status of clients on a day by day and shift-by-shift basis. Therefore it is not unusual to identify any one or several of the following nursing diagnoses among clients experiencing hypoxemia or hypoxia:

- Ineffective Breathing Pattern
- Impaired Gas Exchange
- Anxiety
- Risk for Injury (related to O_2 hazards)

Abnormal assessment findings often lead to collaboration with the physician and the prescription for oxygen therapy.

Administering Oxygen Therapy

Introduction

Oxygen is necessary to maintain life and health. The delivery of oxygen to body's cells depends upon processes include: ***ventilation***, ***alveolar gas exchange***, ***oxygen transport and delivery***, and ***cellular respiration***. Ventilation is regulated by ***respiratory control centers in the medulla oblongata***. The **rate and depth of ventilation** are adjusted in response to changes in concentrations of ***hydrogen ion (pH)*** & ***carbon dioxide (CO2)*** in the body's fluids. For instance, an **↑ in CO_2** in the blood or **↓in pH** in the body's fluids will ➔ stimulate ***faster & deeper ventilation***. **Hypoxemia** will also ➔ stimulate ventilation to a lesser degree. **Hemoglobin molecules** ***bond with oxygen*** molecules in the lungs (oxyhemoglobin) and ***releases oxygen*** to the body's cells in the systemic capillary beds. The **lung tissue** **elasticity** allows the lungs to ***stretch and fill with air*** during inspiration (breathing in) and ***return to a resting position*** after expiration (breathing out). The ***dosage of O_2*** may be ordered as a FIO2 (fraction of inspired oxygen), which is expressed as percentage or liters/minute (lpm).

Time Allowed: 6 - 10 minutes

Practical skills outcomes: At the end of this procedure student will be able to provide Oxygen Therapy effectively and safely.

Definitions & terminology:

- Oxygen therapy: is an intervention for administering more oxygen than present in the atmosphere to prevent or relieve hypoxemia.
- Hypercapnia: Elevation of blood CO_2 levels indicating inadequate alveolar ventilation.
- Hypoxia: inadequate oxygen at the cellular level.
- A flowmeter is a gauge used to regulate the amount of oxygen delivered to the client and is attached to the oxygen source

Indications

▪ Hypoxia/hypoxemia.	▪ Decreased cardiac output.
▪ Increased oxygen demand.	▪ Decreased oxygen carrying capacity.
▪ Increased myocardial workload.	▪ Procedures that may cause hypoxemia.
▪ Clients unable to maintain adequate PO_2 and O_2 saturation levels on room air.	

Safety precautions

- Avoid using petroleum products, aerosol products (hair spray), & products containing acetone (such as nail polish remover) where oxygen is used.
- Secure portable O_2 cylinders to rigid stands.
- Keep O_2 away from open flames & smoking & use only water-soluble lubricants and creams with those receiving oxygen therapies.

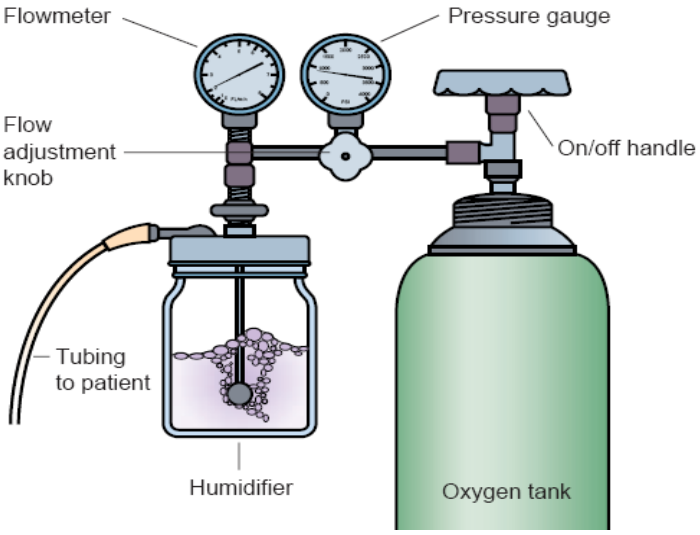
- Make sure to observe patient for signs of O_2 toxicity such as substernal retractions, paresthesias in extremities, dry cough, dyspnea, anorexia, nausea, vomiting, fatigue, lethargy, malaise, restlessness, and progressive ventilatory difficulty.

▪ Post "Oxygen in Use" signs wherever oxygen is stored or in use. ▪ Check that electrical devices have a three-pronged plug. ▪ Inspect electrical equipment for frayed wires or loose connections.	

Quality control

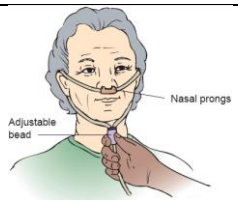
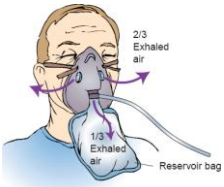
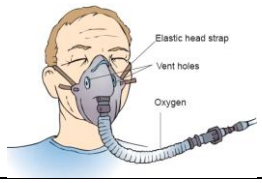
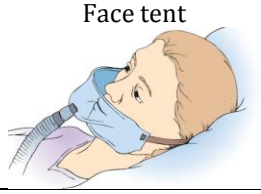
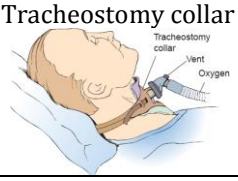
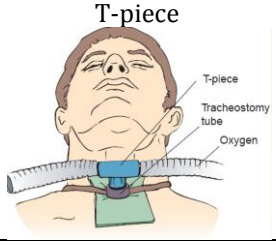
- Recognize and arrange equipment to use; be sure that all are working properly
- Keep a chart on unit gives information on flow rates & settings of different devices.
- Promote client comfort by adjusting tubing or padding.
- Water will often collect in corrugated tubing masks, T-tubes, and tracheostomy tents, creating pulls on the devices and bubbling noises. Try to avoid dependent loops and empty the water from the tubing into the appropriate container.
- Be sure that all equipments are working and attached properly.

Instruments & materials

▪ Stethoscope ▪ Oxygen source—portable or in-line ▪ Oxygen flow meter ▪ Oxygen delivery device: nasal cannula, mask, tent, or T-tube with adapter ▪ Oxygen tubing ▪ Pulse oximetry (optional) ▪ Humidifier and distilled or sterile water (not needed with low flow rates per nasal cannula)	 

Comparison of oxygen delivery devices

Device	Common range of administration	Advantages	Disadvantages
Nasal cannula	2–6 L/min	▪ Is easy to apply;	▪ Dries nasal mucosa at higher

	FIO2 24–40%	promotes comfort ▪ Does not interfere with eating or talking ▪ Is less likely to create feeling of ▪ suffocation	flows ▪ May irritate the skin at cheeks and behind ears ▪ Is less effective in some patients who tend to mouth breathe ▪ Doesn't facilitate administering high FIO2 to hypoxic patients
Masks Simple 	5–8 L/min FIO2 35–50%	▪ Provides higher concentrations ▪ than possible with a cannula ▪ Is effective for mouth breathers or ▪ patients with nasal disorders	▪ Requires humidification ▪ Interferes with eating & talking ▪ Can cause anxiety among those who ▪ are claustrophobic ▪ Creates risk for rebreathing CO2 ▪ retained within mask
Partial rebreather 	6–10 L/min FIO2 35–60%	▪ Increases the amount of oxygen ▪ with lower flows	▪ Requires a minimum of 6 L/min ▪ Creates a risk for suffocation ▪ Requires monitoring to verify that reservoir bag remains inflated at all times
Non-rebreather 	6–10 L/min FIO2 60–90%	▪ Delivers highest FIO2 possible with ▪ a mask	▪ See partial rebreather mask ▪ Creates a risk of oxygen toxicity
Venturi 	4–8 L/min FIO2 24–40%	▪ Delivers FIO2 precisely	▪ Permits condensation to form in tubing, which diminishes the flow of oxygen
Face tent 	8–12 L/min FIO2 30–55%	▪ Provides a comfortable fit ▪ Useful for patients with facial trauma and burns ▪ Facilitates humidification	▪ Interferes with eating ▪ May result in inconsistent FIO2, depending on environmental loss
Tracheostomy collar 	4–10 L/min FIO2 24–100%	▪ Facilitates humidifying and warming oxygen	▪ Allows water vapor to collect in tubing, which may drain into airway
T-piece 	4–10 L/min FIO2 24–100%	▪ Delivers any desired FIO2 with high humidity	▪ May pull on tracheostomy tube ▪ Allows humidity to collect and moisten gauze dressing

Procedures (implementation)

Assessment
1. Determine client history and acute and chronic health problems. COPD will need lower

amounts of oxygen so as not to obliterate their hypoxic respiratory drive. They may also already be on oxygen or need long term continuous therapy.

2. Assess the client's baseline respiratory signs; including airway, respiratory pattern, rate, depth, and rhythm, noting indications of increased work of breathing.

3. Check extremities & mucous membranes closely for color.

4. Review arterial blood gas (ABG) and pulse oximetry results. These are the most important determinants of the effectiveness of pulmonary system and determine the need for therapy.

5. Note lung sounds for rales/crackles. Secretions will interfere with airway patency and diffusion of oxygen and carbon dioxide across the alveolar capillary bed.

6. Assess nares, behind earlobes, cheek, trach site, or other places where O_2 tubing or equipment is in constant contact with skin to look for signs of skin irritation or breakdown.

Diagnosis

- ★ Impaired Gas Exchange
- ★ Risk for Injury
- ★ Risk for Impaired Skin Integrity
- ★ Ineffective Breathing Pattern
- ★ Ineffective Airway Clearance
- ★ Activity Intolerance

Expected Outcomes:

1. Oxygen levels will return to normal in blood and tissues as evidenced by oxygen saturation 95%, skin color normal.
2. Respiratory rate, pattern, and depth will be within the normal range.
3. The client will not develop any skin or tissue irritation or breakdown.
4. Breathing efficiency and activity tolerance will be increased.
1. 5. The client will understand the rationale for the therapy.

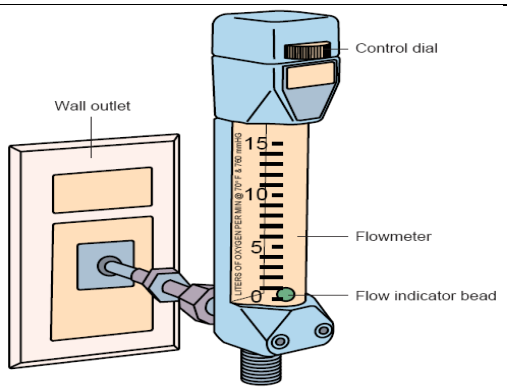
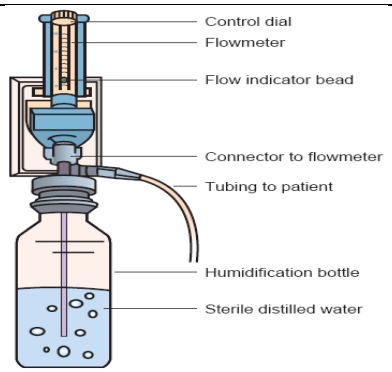
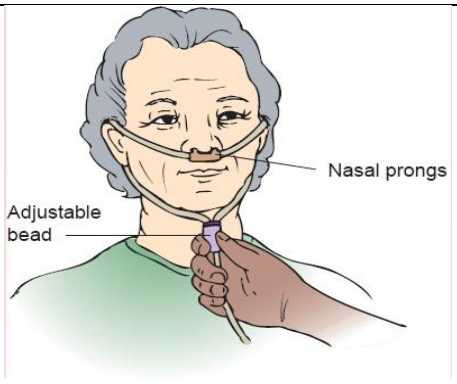
Client education needed

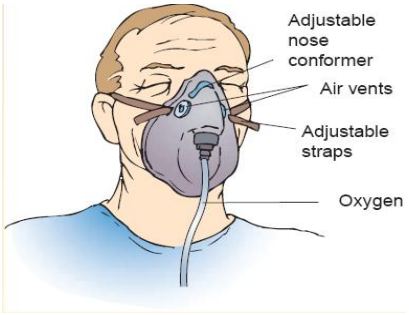
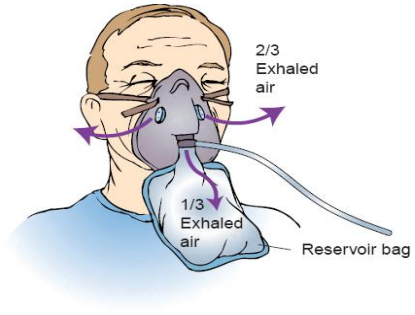
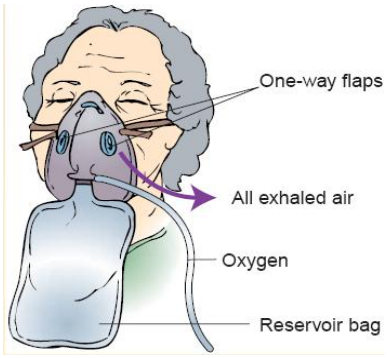
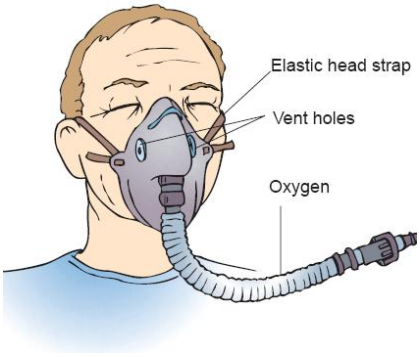
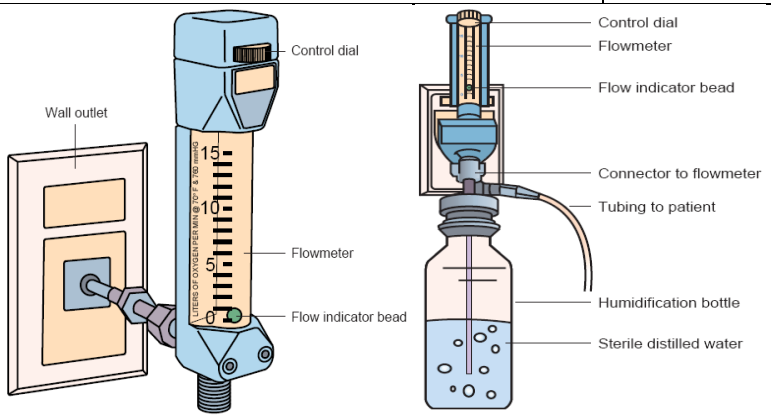
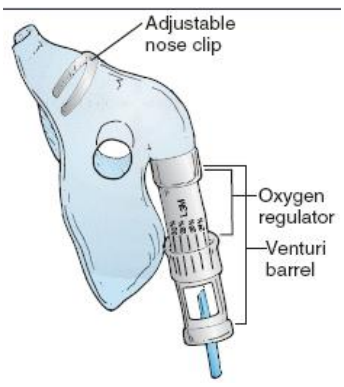
1. Clearly explain to the client the reason for oxygen therapy.
2. Help the client understand the importance of leaving the delivery system on.
3. Use pictures to help clients understand the lungs and their airway so that they will be more likely to cooperate with the therapy.
4. Clients know signs & symptoms indicate ineffective therapy and needs to be changed.
2. 5. Reinforce safety issues—don't make clients overly afraid of a fire, but make sure they understand that oxygen does support combustion.

Implementation

Nasal cannula

1. Wash hands.	Reduces transmission of microorganisms.
2. Organize equipment.	Organizing equipment before beginning procedure enhances efficiency and safety.
3. Explain procedure to patient.	Ensures that patient is informed, and decreases patient anxiety.
4. Prepare humidifier: Add distilled water if	Delivers humidified oxygen to mucous

needed or remove prefilled humidifier from package and screw enclosed spike cap to bottle.	membranes of airway.
5. Connect humidifier to flow meter, and connect humidifier to tubing attached to cannula.	Controls flow of oxygen and connects humidification to oxygen delivery system.
	
6. Turn oxygen flow meter on until bubbling is noted in humidifier.	Ensures connections are intact & O_2 delivered will be humidified.
7. Check order.	
8. Adjust flow of oxygen via flow meter.	Regulates oxygen flow delivery.
	
9. Put on gloves.	Reduces transmission of microorganisms.
10. Place tips of cannula in patient's nares; fit tubing over ears, tighten tubing under chin, and adjust to proper fit.	Ensures proper fit of nasal cannula.
	
11. Position patient for comfort and ease of breathing with head of bed elevated.	Facilitates lung expansion for adequate gas exchange.
12.Evaluate respirations & O_2 saturation	Determines adequacy of oxygen delivery
Simple face mask, partial rebreather mask, nonrebreather mask & venturi mask	

Simple Face Mask  	Partial Rebreather Mask, 
Nonrebreather Mask  	Venturi Mask 
13. Wash hands.	Reduces transmission of microorganisms.
14. Organize equipment.	Enhances efficiency and patient safety.
15. Explain procedure to patient.	Inform patient & decrease patient anxiety
16. Prepare humidifier: Add distilled water if needed or remove prefilled humidifier from package and screw enclosed spike cap to bottle.	Delivers humidified oxygen to mucous membranes of airway.
17. Connect humidifier to flowmeter, and then connect humidifier to mask tubing.	Controls flow of oxygen and connects humidification to oxygen delivery system.
18. Turn oxygen flow meter on until bubbling is noted in humidifier.	Ensures connections are intact and that oxygen delivered will be humidified.
  	
19. Put on gloves.	Reduces transmission of microorganisms.
20. Place mask over nose, mouth & chin; adjust metal strip over nose bridge to fit securely & pull elastic band around back of head & tighten to fit.	Ensures proper fit of mask.
21. Position patient for comfort and ease of	Facilitates lung expansion for adequate

breathing with head of bed elevated.	gas exchange.
22. Evaluate patient's respirations and oxygen saturation.	Determines adequacy of oxygen-delivery system for patient.

Evaluation
▪ Oxygen levels returned to normal in blood and tissues as evidenced by oxygen saturation $ 95%, skin color normal. ▪ Respiratory rate, pattern, and depth are within the normal range. ▪ The client did not develop any skin or tissue irritation or breakdown. ▪ Breathing efficiency and activity tolerance are increased. ▪ The client understands the rationale for the therapy. ▪ Assess the patient's: ▪ Oxygen saturation, and compare to baseline ▪ Quality and rate of respirations & compare to baseline ▪ Vital signs, and compare to baseline ▪ Comfort level

Documentation

- Record O_2 rate and note method of oxygen delivery.
- Document client's assessment parameters & response to treatment.
- Assessment of patient's respiratory status prior to initiation of oxygen therapy, including oxygen saturation & description of respirations including rate.
- Type of oxygen-delivery method initiated.
- Time of initiation of oxygen-delivery method.
- Percentage of oxygen currently being given.