Oxygen Therapy

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Oxygen Therapy

Definition:

- Oxygen is a colorless, odorless, tasteless gas that is essential for the body to function properly and to survive.
- Oxygen therapy is the administration of oxygen at a concentration of pressure greater than that found in the environmental atmosphere
- The air that we breathe contain approximately 21% oxygen.
- Oxygen therapy is a key treatment in respiratory care.

Purpose

- The body is constantly taking in oxygen and releasing carbon dioxide.

- If this process is inadequate, oxygen levels in the blood decrease, and the patient may need supplemental oxygen.

- The purpose is to increase oxygen saturation in tissues where the saturation levels are too low due to illness or injury.

INDICATIONS:

- ACUTE RESPIRATORY FAILURE
- ACUTE MYOCARDIAL INFARCTION
- CARDIAC FAILURE
- SHOCK
- HYPERMETABOLIC STATE INDUCED BY TRAUMA, BURNS OR SEPSIS
- ANAEMIA
- CYANIDE POISONING
- DURING CPR
- DURING ANAESTHESIA FOR SURGERY

OXYGEN – A PRESCRIBED DRUG

- MUST BE WRITTEN LEGIBLY BY THE DOCTOR
- PRESCRIPTION SHOULD BE DATED BY THE DOCTOR
- DOCTOR MUST INDICATE DURATION OF O2 THERAPY
- THE O2 % CONCENTRATION MUST BE PRESCRIBED
- THE FLOW RATE MUST BE PRESCRIBED

Sources of oxygen:

1. Oxygen cylinder.
2. Oxygen wall outlets.

Oxygen cylinder

1- Using oxygen cylinders:

- The oxygen cylinder is delivered with a protective cap to prevent accidental force against the cylinder outlet.

- To release oxygen safety and at a desirable rate, a regulator is used.

- A reduction gauge that shows the amount of oxygen in the tank.
- A flow meter that regulates the control of oxygen in liters per minutes.
- Oxygen is moistened by passing it through a humidifier to prevent the mucous membranes of the respiratory tree from becoming dry.


flow meter
pressure gauge
screw cap
flow adjuster
flowmeter.en.alibaba.com
pressure reducing valve
oxygen output
safety valve
humidifying cup
oxygen-in pipe

2- Wall – outlet oxygen:

- The oxygen is supplied from a central source through a pipeline.
- Only a flow meter and a humidifier are required.

2- Wall – outlet oxygen:

Oxygen Delivery Systems:

1. Nasal Cannula
2. Simple Mask
3. Partial Re-Breather Mask
4. Non-Re Breather Mask (NRBM)
5. Venturi Mask

Methods of oxygen administration:

- **Nasal cannula (prongs):**

❖ **It is a disposable, plastic devise with two protruding prongs for insertion into the nostrils, connected to an oxygen source.**

❖ **Used for low-medium concentrations of Oxygen (24-44%).**

Nasal cannula (prongs):

Nasal cannula (prongs):

Amount Delivered

Fio2 (Fraction Inspired Oxygen)

Low flow- 24-44 %

1 L\min=24%

2 L\min=28%

3 L\min=32%

4 L\min=36%

5 L\min=40%

6 L\min=44%

Nasal cannula (prongs):

Advantages

- Client able to talk and eat with oxygen in place
- Easily used in home setting
- Safe and simple
- Easily tolerated
- Delivers low concentrations

Nasal cannula (prongs):

- ***Disadvantages:***
- Unable to use with nasal obstruction
- Drying to mucous membranes, so flow greater than 4 L/min needs to be humidified
- Can dislodge from nares easily
- Causes skin irritation or breakdown over ears or at nares
- Not good for mouth breathers
- Patient's breathing pattern affects exact FIO2

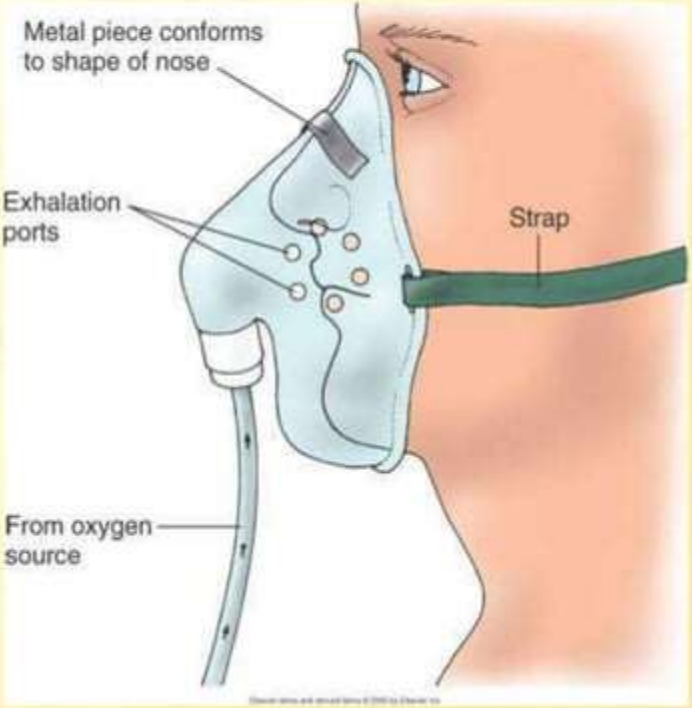
FACE MASK

- The Simple Oxygen Mask
- The Partial Re-Breather Mask
- The Non Re- Breather Mask
- The Venturi Mask

The simple Oxygen mask

- Simple mask is made of clear, flexible , plastic or rubber that can be molded to fit the face.
- It is held to the head with elastic bands.
- Some have a metal clip that can be bent over the bridge of the nose for a comfortable fit.

The simple Oxygen mask



The simple Oxygen mask

- It delivers 35% to 60% oxygen .
- A flow rate of 6 to 10 liters per minute.

- It has vents on its sides which allow room air to leak in at many places, thereby diluting the source oxygen.

- Often it is used when an increased delivery of oxygen is needed for short periods (i.e., less than 12 hours).

The simple Oxygen mask

✓**Advantages**:

✓**Can provide increased delivery of oxygen for short period of time**

The simple Oxygen mask

- ✓**Disadvantages**:
- ✓**Tight seal required to deliver higher concentration**
- ✓**Difficult to keep mask in position over nose and mouth**
- ✓**Potential for skin breakdown (pressure, moisture)**
- ✓ **Uncomfortable for pt while eating or talking**
- ✓ **Expensive with nasal tube**

The simple Oxygen mask

Nursing interventions:

- **Monitor client frequently to check placement of the mask.**
- **Secure physician's order to replace mask with nasal cannula during meal time**

The Partial Re Breather Mask:

- The mask is with a reservoir bag that must remain inflated during both inspiration & expiration
- It collects of part of the patients' exhaled air.
- It is used to deliver oxygen concentrations up to 80%.

The Partial Re Breather Mask:

- The oxygen flow rate must be maintained at a minimum of 10 L/min to ensure that the patient does not re-breathe large amounts of exhaled air.
- The remaining exhaled air exits through vents.

The Partial Re Breather Mask:

- *Advantages*
- Client can inhale room air through openings in mask if oxygens supply is briefly interrupted
- *Disadvantages*

➢Requires tight seal (eating and talking difficult, uncomfortable)

The Non Re- Breather Mask

- This mask provides the highest concentration of oxygen (95-100%) at a flow rate10-15 L/min.
- It is similar to the partial re-breather mask except two one-way valves prevent conservation of exhaled air.
- The bag has an oxygen reservoir

.....The Non Re- Breather Mask

- When the patient exhales air the one-way valve closes and all of the expired air is deposited into the atmosphere, not the reservoir bag.
- In this way, the patient is not re-breathing any of the expired gas.

……The Non Re- Breather Mask

.....The Non Re- Breather Mask

- ***Advantages***

➢ **Delivers the highest possible oxygen concentration**

➢ **Suitable for pt breathing spontaneous with sever hypoxemia**

.....The Non Re- Breather Mask

- ***Disadvantages***

- Impractical for long term Therapy
- Malfunction can cause CO_2 buildup
- suffocation
- Expensive
- Uncomfortable

Venturi Mask

- It is high flow oxygen delivery device.
- Oxygen from 40 - 50% At liters flow of 4 to 15 L/min.
- The mask is constructed so that there is a constant flow of room air blended with a fixed concentration of oxygen

.....Venturi Mask

.....Venturi Mask

- Designed with wide- bore tubing and various color - coded jet adapters.
- Each color code corresponds to a precise

oxygen concentration and a specific liter flow.

.....Venturi Mask

- It is used primarily for patients with chronic obstructive pulmonary disease

.....Venturi Mask

- ***Advantages***

➢**Delivers most precise oxygen Concentration**

➢**Doesn't dry mucous membranes**

- ***Disadvantages***

➢**uncomfortable**

➢**Risk for skin irritation**

➢**Produce respiratory depression in COPD patient with high oxygen concentration 50%**

Side Effects & Complication Of Oxygen Therapy

- Oxygen toxicity
- Retro lental fibroplasia
- Absorption atelectasis

Oxygen Toxicity

It is a condition which occurs due to inspiration of a high concentration of oxygen for aprolonged period of time.

- Oxygen concentration greater than 50% over 24 to 48 hours can cause pathological changes in the lungs.

Side Effects & Complication Of Oxygen Therapy

- **Retrolental fibroplasia**

Blindness due to vasoconstriction & Ischemia (premature infants)

Side Effects & Complication Of Oxygen Therapy

Absorption Atelectasis :

During 100% oxygen delivery, nitrogen in alveoli is washed out and replaced by oxygen.

In contrast to nitrogen, oxygen is extremely soluble in blood and diffuses very quickly into the pulmonary vasculature, so that not enough gas is left in the alveoli to maintain patency, and the alveolus collapses; this is known as absorption atelectasis

Safety Precautions During Oxygen Therapy

- Oxygen is a highly combustible gas.
- Although it does not burn spontaneously or cause an explosion, it can easily cause a fire in a patient's room if it contacts a spark from an open flame or electrical equipment

.....Safety Precautions

- Oxygen is a therapeutic gas and must be prescribed and adjusted only with a health care provider's order.
- Place an "Oxygen in Use" sign on the patient's door and in the patient's room.
- If using oxygen at home, place a sign on the door of the house.
- No smoking should be allowed on the premises

.....Safety Precautions

- Keep oxygen-delivery systems 10 feet from any open flames.
- Determine that all electrical equipment in the room is functioning correctly.
- When using oxygen cylinders, secure them so they do not fall over. Store them upright and either chained or secured in appropriate holders.
- Check the oxygen level of portable tanks before transporting a patient to ensure that there is enough oxygen in the tank

Evaluation:

- Breathing pattern regular and at normal rate.
- pink color in nail beds, lips, conjunctiva of eyes.
- No confusion, disorientation, difficulty with cognition.
- Arterial oxygen concentration or hemoglobin
- Oxygen saturation within normal limits.

Documentation:

- Date and time oxygen started.
- Method of delivery.
- Oxygen concentration and flow rate.
- Patient observation.
- Add oronasal care to the nursing care plan