

# TOPICAL ADMINISTRATION OXYGEN INHALATION

Presented by  
Mrs. Preethi Ramesh  
Senior Nursing Lecturer  
BGI



# OXYGEN INHALATION

Patients with respiratory impairment are treated by Oxygen Inhalation to relieve hypoxaemia ( deficiency O<sub>2</sub> in the blood). The normal amount of O<sub>2</sub> in arterial blood is 80-100mmHg. If it falls below 60mmHg, irreversible physiologic effect may occur. Tissues vary in O<sub>2</sub> requirements. Cerebral cell get 20% of body's O<sub>2</sub> supply and live only for few minutes ( 5-7min) if their O<sub>2</sub> supply is cut off. Oxygen administration treats the effects of O<sub>2</sub> deficiency but it doesn't correct the underlying causes.



# OXYGEN INHALATION

## Indications of oxygen therapy:

- ❖ Cyanosis : Bluish colour of the skin, nail beds and mucous membranes, resulting from a decreased amount of oxygen in the hemoglobin of the blood.
- ❖ Breathlessness : caused by disease such as asthma, emphysema, pulmonary embolism, coronary thrombosis & other cardiac insufficiencies.
- ❖ An environment low in oxygen content : high altitudes
- ❖ Anemia : deficiency of either quality or quantity of red corpuscles in the blood giving rise to symptoms of anoxemia.



# OXYGEN INHALATION

## Indications of oxygen therapy:

- ❖ Diseases or condition in the oxygen across the alveolar-capillary membranes - pulmonary edema, pneumonia, chest trauma.
- ❖ Patient whose respiratory capacity is diminished by diseases or conditions like atelectasis, pneumonectomy, thoracoplasty.
- ❖ Poisoning with chemicals that alter the tissue's ability to utilize oxygen , cyanide poisoning.
- ❖ Shock and respiratory failure.
- ❖ Hemorrhage and air hunger.
- ❖ Patient under anesthesia.



# OXYGEN INHALATION

## Indications of oxygen therapy:

- ❖ Patients who are critically ill.
- ❖ Patients with psychologically induced breathlessness.
- ❖ Asphyxia : condition in lack of oxygen in the lungs leading to unconsciousness caused by blocking of the air passage by foreign bodies, drowning, electrical shock, strangulation, inhalation of poisonous gases.



# OXYGEN INHALATION

**Methods of oxygen administration:**

**Depending factors are:**

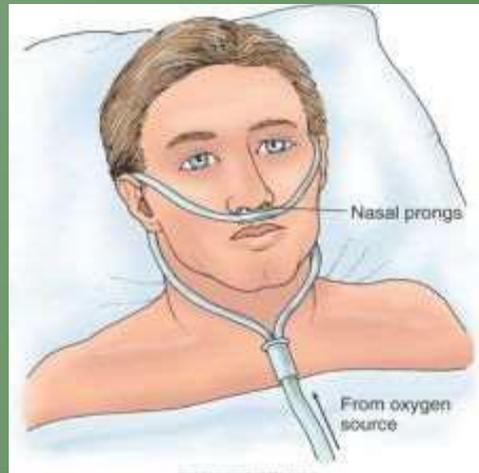
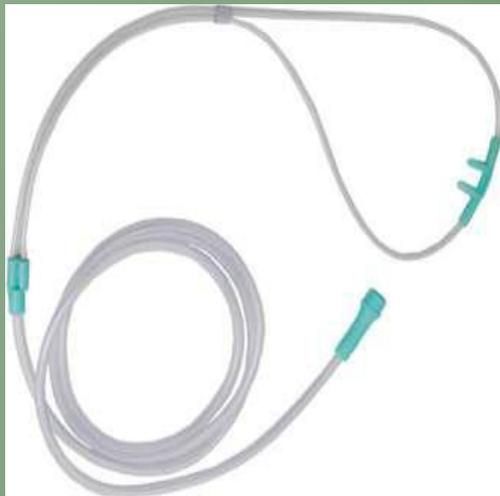
1. Condition of the patient
2. The concentration to be given
3. The facilitation available
4. Preference of the physician



# METHODS OF OXYGEN ADMINISTRATION

## NASAL CANNULA

A nasal cannula is a simple comfortable device. The two cannula about 1.5cm (1/2inch) long, protrude from the center of disposable tube and are inserted into the nares. O<sub>2</sub> is delivered via the cannula with a flow rate of up to 4L/min. Higher flow rates dry the air mucosa.



# METHODS OF OXYGEN ADMINISTRATION

## NASAL CANNULA Cont...

low oxygen device

**Delivers 25-45% FIO<sub>2</sub> at 1-6 L/min flow**

1. Flow 0 liters per minute: 21% (Room Air)
2. Flow 1 liters per minute: 25%
3. Flow 2 liters per minute: 29%
4. Flow 3 liters per minute: 33%
5. Flow 4 liters per minute: 37%
6. Flow 5 liters per minute: 41%
7. Flow 6 liters per minute: 45%



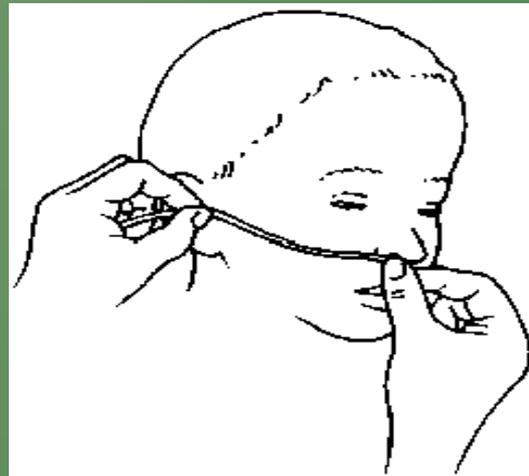
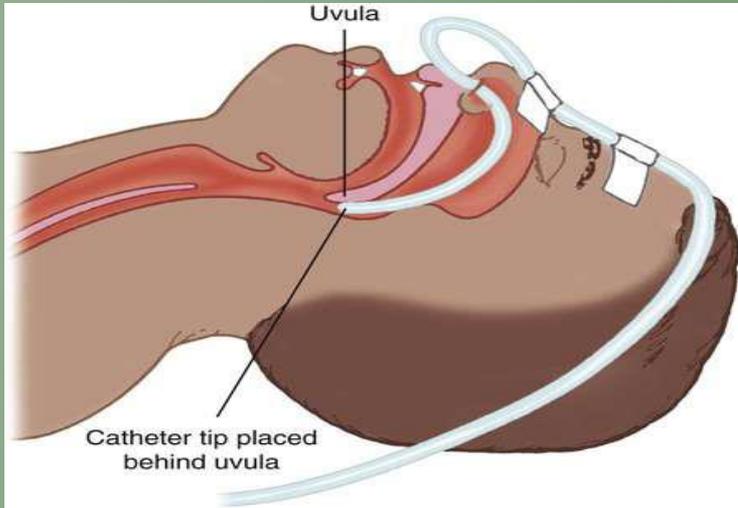
# METHODS OF OXYGEN ADMINISTRATION

## NASAL CATHETER

- Most common Method.
- Catheter inserted into the nostril reaching up to the uvula.
- Catheter not interfere the patients freedom to eat , talk , move on the bed.
- Flow :- 1 - 4 L/min; 22% - 30% oxygen.
- Catheter changed – 8hrly



# METHODS OF OXYGEN ADMINISTRATION



# METHODS OF OXYGEN ADMINISTRATION

## OXYGEN BY MASK

An O<sub>2</sub> mask is a device used to administer oxygen, humidity or heated humidity. It fits over the mouth & nose & is secured in place with a strap

❖ Two primary types of mask.

1. High concentration
2. Low concentration

Masks are advantageous for patient who are unable to breath through the nose. B.L.B. ( Boothby , Lovelace and Bullbulian) masks - rebreathing bags consisting of a face mask attached to a reservoir bag.



# METHODS OF OXYGEN ADMINISTRATION

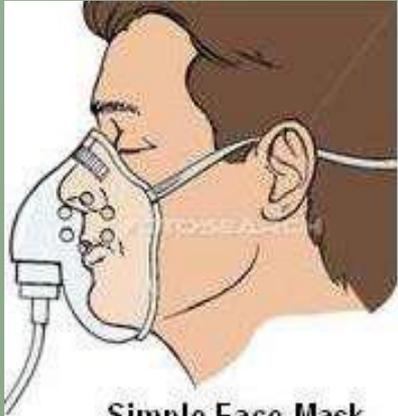
## OXYGEN BY MASK

- ❖ **A plastic face mask with a reservoir bag and a venturi mask** – capable of delivering higher concentration of oxygen. When use as a non – breather, the plastic face mask with a reservoir can deliver from 80% - 90% oxygen, ( 70% when used as rebreather ) with a flow rate of 10L/min.
- ❖ **The venturi mask** – deliver oxygen concentration of 24% to 28%, 30, 35%, 40%, 55% with oxygen flow rates of 2 to 3,4,6,8,14 L/min respectively.
- ❖ **Simple face mask** – used for short oxygen therapy. It delivers O<sub>2</sub> concentration from 30 – 60% with a flow rate of 8 to 12 L/min



# METHODS OF OXYGEN ADMINISTRATION

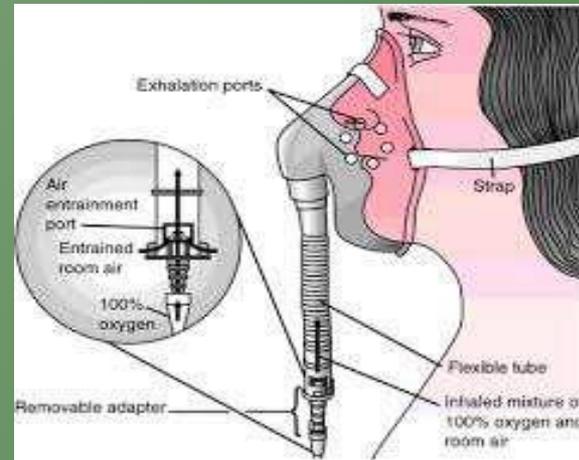
## OXYGEN BY MASK



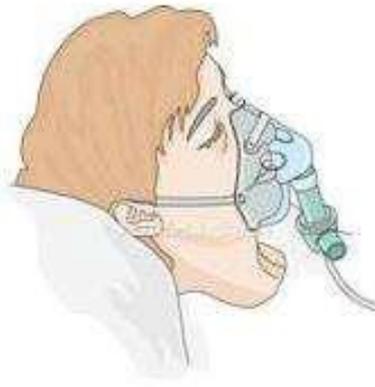
Simple Face Mask



Partial Rebreather Mask



Non Rebreather Mask



Venturi Mask



# METHODS OF OXYGEN ADMINISTRATION

## VENTURI VALVE



### Venturi mask flow rates

Venturi valve colour	Inspired oxygen concentration (%)	Oxygen flow (l/min)	Total gas flow (l/min)
Blue	24	2-4	51-102
White	28	4-6	44-67
Yellow	35	8-10	45-65
Red	40	10-12	41-50
Green	60	12-15	24-30

BRADLEY HANMADA



### Adjustable venturi valve



# METHODS OF OXYGEN ADMINISTRATION

## OXYGEN TENT

It consists of canopy over the patient's bed that may cover the patient fully or partially, and it is connected to a supply of oxygen. Canopies are transparent, enable the nurses to observe the patient. The lower part of the canopy is tucked under the bed.

❑ Advantages of using oxygen tent:

- Provide an environment for the patient with controlled oxygen concentration , temperature regulation and humidity controlled.
- Allows freedom for free movement in bed.



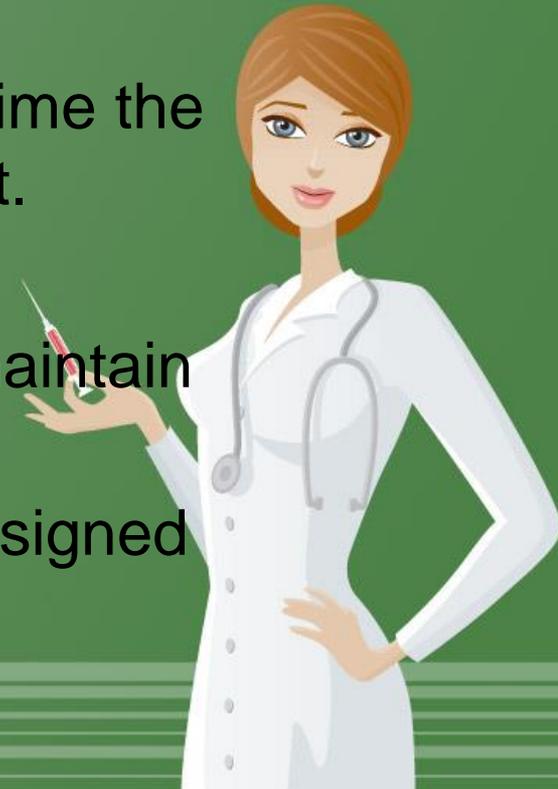
# METHODS OF OXYGEN ADMINISTRATION

## OXYGEN TENT

❑ Disadvantages of using oxygen tent:

- Create a feeling of isolation.
- Requires high volume of oxygen ( 10 – 12 L/min ) , cannot be made available ordinarily.
- Loss of desired concentration occurs each time the tent is opened to provide care for the patient.
- There is an increased chances of fire.
- Requires much time and effort to clean or maintain a tent.

The “infant incubator” is like an oxygen tent designed to maintain a constant temperature.



# METHODS OF OXYGEN ADMINISTRATION

## TRANSTRACHEAL OXYGEN

A method used for delivery of oxygen to chronic lung diseases, insert – small IV catheter directly into the trachea through a surgical tract in the lower neck. O<sub>2</sub> is delivered directly into the trachea. Advantage in patient who requires continuous oxygen administration for following reasons.

- Less expensive – No loss of oxygen
- Oxygen reaches directly – client achieve adequate oxygenation.
- Patient tend to use oxygen b'coz of mobility, comfort and cosmetic improvement.
- Additional humidification is not needed.



# METHODS OF OXYGEN ADMINISTRATION

## Oxygen Percentage Delivery by Device



<u>Device</u>	<u>Oxygen Conc.</u>	<u>Flow in L/min</u>
Nasal cannula	25% - 45%	1 - 6
Simple face mask	40% - 60%	6 - 10 (8-10 recommended)
Partial rebreather mask	35% - 60%	6 - 10
Nonrebreather mask	60% - 100%	10 - 15
Venturi mask	24% - 50%	4 - 8



# SUPPLY OF OXYGEN

## O<sub>2</sub> Supply by

### Cylinder of Tanks

Store under pressure of  
2200 pounds ( 1000kgs) per  
Sq inch

### Piped In Oxygen

Store under low pressure about  
50 – 60 pounds per sq inch



# CARE OF OXYGEN CYLINDERS

- Use the cylinders with a metal case to prevent the danger of falling and breaking.
- Placed at the head end of the bed, away from the traffic areas where these are likely to be knocked down.
- Any sources of fire should be kept away from the cylinder. Oxygen is not explosive, but it supports combustion, which means that a spark of flames can cause a major fire.
- Stored in a cool temp, away from heaters (high temperature cause expansion of the gas, with consequent loss of gas through the safety valves )



# CARE OF OXYGEN CYLINDERS

- The supply of oxygen must always be equipped with a regulator to control flow of gas.
- Avoid grease on the regulator – in high O<sub>2</sub> concentration, oil are likely to catch the fire and the cylinder may explode.
- Every NURSE , PATIENT, his FAMILY members and VISITORS should be aware of the danger of fire and explosion in an oxygen therapy unit. WARNING SIGNS like NO SMOKING should be placed at the unit where the O<sub>2</sub> is On.



# CARE OF OXYGEN CYLINDERS

- When cylinders are empty, mark 'EMPTY' and send for filling.
- Inspect the apparatus at frequent interval and make sure for its good working condition.
- The nurse should learn working of cylinders, regulators, etc. The cylinder is opened by turning the large valve at the end of the cylinder with a spanner, by turning it anti-clockwise. The wheel valve at the side of regulator is opened by turning it anti-clockwise.
- To test any leakage in the regulator, soap lather may be used. If there is leakage, bubbles are seen.



# HAZARDS OF OXYGEN INHALATION

- ❖ **Infection:** The use of contaminated equipment can spread infection in the patient. The causative organisms may be present in such places as catheters, tracheostomy or ET tubes, humidifying water & masks.
- ❖ **Combustion ( fire ):** Since it supports combustion, fire is a potential hazard when oxygen is administered.
- ❖ **Drying of the mucous membrane of respiratory tract:** If O<sub>2</sub> is administered without sufficient humidity, it causes drying & irritation of the mucus membranes.
- ❖ **Oxygen toxicity:** Starts with tracheal irritation & cough. Symptoms are dryness & irritation of mucus membrane, nausea, vomiting & dyspnoea.
- ❖ **Atelectasis:** Collapse of alveoli develops as a result of increased O<sub>2</sub> concentration in the inspired air.



# HAZARDS OF OXYGEN INHALATION

- ❖ **Oxygen Induced apnoea:** Since the CO<sub>2</sub> is washed off completely from the blood by a high concentration of O<sub>2</sub>, the respiratory centre is not stimulated sufficiently.
- ❖ **Retrolental fibroplasia:** Oxygen therapy may affect the eyes. It is noted in premature infants who have a high concentration of O<sub>2</sub> inhalation, which develops fibrotic change behind the lens which impairs the light penetration to the retina.
- ❖ **Asphyxia:** Pts receiving oxygen inhalation by means of masks & closed tents must be protected from the danger of asphyxia resulting from unexpected depletion of oxygen in the oxygen cylinders.



# HAZARDS OF OXYGEN INHALATION

- ❖ **Oxygen Induced apnoea:** Since the CO<sub>2</sub> is washed off completely from the blood by a high concentration of O<sub>2</sub>, the respiratory centre is not stimulated sufficiently.
- ❖ **Retrolental fibroplasia:** Oxygen therapy may affect the eyes. It is noted in premature infants who have a high concentration of O<sub>2</sub> inhalation, which develops fibrotic change behind the lens which impairs the light penetration to the retina.
- ❖ **Asphyxia:** Pts receiving oxygen inhalation by means of masks & closed tents must be protected from the danger of asphyxia resulting from unexpected depletion of oxygen in the oxygen cylinders.



**CONTINUES...**

**HAVE**

**A**

**BEAUTIFUL DAY**

