
OXYGEN THERAPY

Overview

Oxygen is one component of the air that is all around us. It is a colorless, odorless, tasteless gas that forms 21% of our atmosphere. About two-thirds of the human body is composed of oxygen. About nine-tenths of all water is oxygen. It is absolutely essential to life on this planet. The human body must constantly take in fresh oxygen. We cannot survive longer than a few minutes without it.

How a Healthy Person Processes Oxygen

When we inhale, our respiratory system takes oxygen in through the nose, warming it as it moves down the trachea (windpipe), through the bronchial tree and into the lungs. Once in the lungs, the oxygen moves into the blood through special cells called alveoli. In the blood, red blood cells trade waste products (carbon dioxide) for oxygen and carry the fresh oxygen to the cells.

When everything is working properly, the oxygen goes into the blood and to every cell in our body, providing oxygen for energy, growth and cell reproduction. When the demand for oxygen increases, as when we exercise, we take more air into the body to meet the needs of the cells. The body also uses the mechanism of breathing to release carbon dioxide, a waste product, from the body. As we exhale, the carbon dioxide leaves the body.

When Things Don't Work Right

When something goes wrong with the body's normal method for processing oxygen, medications and supplemental oxygen are used to help make sure the body gets the oxygen it needs.

If a patient has heart failure, he or she may have difficulty breathing. In this case, oxygen is often given along with special medications to make sure tissues in the heart and throughout the body receive needed oxygen.

If a patient has emphysema or chronic obstructive pulmonary disease (COPD), the alveoli become ineffective in exchanging oxygen for carbon dioxide. Supplemental oxygen therapy helps meet the patient's need for oxygen.

Patients with sleep disorders such as sleep apnea may also need oxygen therapy.

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Other conditions, such as asthma, pneumonia, bronchitis and severe allergies, may require short-term use of oxygen therapy. Usually, people with these conditions use extra oxygen for only a short time, until they are well.

Oxygen Therapy

Some people use oxygen only while exercising, others only while sleeping, and still others need oxygen continuously. A person's physician can do blood tests to help determine how much oxygen is needed and when. Oxygen therapy is a plan of oxygen supplementation prescribed by a doctor.

For people who do not get enough oxygen naturally, supplements of oxygen can have several benefits. Supplemental oxygen can improve their sleep and mood, increase their mental alertness and stamina, and allow their bodies to carry out normal functions. It also prevents heart failure in people with severe lung disease.

Oxygen at very high levels over a long period of time can be toxic and very harmful to one's health. Therefore, a doctor's prescription is required. Oxygen used to treat medical conditions is a drug. We administer and document oxygen therapy according to the rules that govern medication administration.

The doctor's prescription will spell out the flow rate in liters per minute (LPM or L/M). This is how much oxygen the person needs per minute, and it should not be changed without a doctor's order.

Obtaining oxygen equipment

Medical equipment suppliers provide oxygen and an oxygen delivery system as ordered by a physician. When a patient obtains an oxygen system from the medical equipment supplier, you'll learn how to assist the patient to set it up, check for problems and clean it. Keep the supplier's phone number handy in case of problems.

Types of oxygen delivery systems

The purpose of oxygen delivery systems is to get extra oxygen into the person's respiratory system and blood. Oxygen is available from three different delivery systems. Each system of delivery has advantages and disadvantages.

The systems are:

- **Compressed gas.** Oxygen gas can be compressed and stored in tanks or cylinders of steel or aluminum. These tanks come in many sizes. Larger ones usually stay in one place, and people take the smaller ones with them when they want to move around. The tanks must be refilled with oxygen when the oxygen in them is gone.

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- **Liquid oxygen.** When oxygen gas is cooled, it changes to a liquid form. People who are more active often use liquid oxygen, because larger amounts of oxygen can be stored in smaller, more convenient containers than compressed oxygen. The disadvantage is that liquid oxygen cannot be kept for a long time because it will evaporate. The containers must be refilled with liquid oxygen.
- **Oxygen concentrators.** Oxygen concentrators deliver higher concentrations of oxygen from the air. An oxygen concentrator is an electric device about the size of an end table. It produces oxygen by concentrating the oxygen that is already in the air and eliminating other gases. This method is less expensive, easier to maintain and doesn't require refilling, but it is not portable. Some oxygen concentrators give off heat and are noisy. Backup methods are necessary in case of a power failure, and the electric bill may rise. Oxygen concentrators may not deliver enough oxygen for some people. An oxygen concentrator will usually include a humidifier to warm and add moisture to the prescribed oxygen.

Skilled care facilities sometimes have a system for delivering oxygen directly into the person's room or apartment. Individuals living in any setting may have large tanks to store large amounts of liquid oxygen or compressed oxygen gas. In either case, the patient may need small, portable tanks of liquid or compressed oxygen for brief periods — a few hours — outside his or her room or apartment. Portable tanks are a backup system suitable to use in an emergency or when the patient leaves the room or apartment for meals or outings.

Oxygen administration

Oxygen is usually administered with continuous flow through a two-pronged nasal tube called a nasal cannula, even though this system wastes oxygen. To improve efficiency and increase the person's ability to move around, there are other devices. These include face masks, reservoir cannulas and demand-type systems. Usually, a respiratory therapist, a medical equipment specialist, nurse or physician instructs the person about proper oxygen use.

General guidelines

When assisting with an oxygen tank, an oxygen concentrator or liquid oxygen, follow these important guidelines:

- Always stabilize the oxygen tank (using a special stand) and store it in an area that is out of the way so it will not fall.
- Close the oxygen tank tightly when not in use.
- Because oxygen can cause an explosion, keep the oxygen tank away from any flammable source, such as matches, heaters or hair dryers.

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- Check the water level in the humidifier bottle (if one is provided) often. If it is near or below the refill line, pour out any remaining water and refill it with sterile or distilled water.
- If the patient complains of his or her nose “drying out,” ask your supervisor about obtaining a water-soluble lubricant like K-Y Jelly to help keep nasal passages moist. Do not use petroleum-based products.
- If the oxygen tubing irritates the patient’s skin (on sides of face or behind ears), ask your supervisor about using cotton balls or getting special moleskin protectors to protect skin from the tubing.
- If the patient’s supply of oxygen is getting low (for portable tanks), advise him or her to reorder, or check with your supervisor about reordering. Oxygen should be ordered at least two or three days in advance to allow time for delivery.
- Maintain the oxygen flow at the prescribed rate. If you’re not sure whether oxygen is flowing, check the tubing for kinks, blockages or disconnection. Then make sure the system is on. If you’re still unsure, submerge the nasal cannula in a glass of water, with the prongs pointing down. If bubbles appear, oxygen is flowing through the system. Shake off extra water before reinserting the cannula in the patient’s nose.

Safety Tips

In September 2019, there were 311 home oxygen fire incidents between December 2017 and August 2019. These fires accounted for 164 deaths, 71 serious injuries and 199 minor injuries. Eleven of the deaths were to caregivers or first responders, according to article “The prevalence and impact of home oxygen fires in USA,” by BPR Medical.

The following are safety tips and steps you can take to decrease the risk of fires in homes with oxygen equipment.

- Oxygen is highly combustible and may explode. It should not be used near electrical equipment or while using an electric appliance, such as an electric razor.
- A sign should be placed on or near the apartment or room door to alert visitors that oxygen is in use. If there is not a sign on the door, contact your agency.
- Familiarize yourself with the location of fire extinguishers in the patient’s home or in the care agency. If a fire does occur, turn off the oxygen immediately.
- Check for working smoke detectors. Assist patient with testing smoke detectors and changing batteries every 6 months.
- Don’t smoke — and don’t allow patients or others to smoke — near the oxygen system. Keep the system away from direct sunlight, space heaters and other sources of heat, and open flames such as in a gas stove.

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- Don't run oxygen tubing under clothing, bed covers, furniture or carpets.
- Keep the oxygen system upright.
- If using oxygen cylinders, store them in a protective stand or cart.
- Make sure the oxygen is turned off when not in use.
- Keep oxygen concentrators away from the wall to allow air to circulate.
- Notify your supervisor if any of the above safety concerns are present.

When to call your supervisor

The patient may not be getting enough oxygen if you notice the following signs:

- Difficult, irregular breathing
- Restlessness or anxiety
- Tiredness or drowsiness
- Blue fingernail beds or lips
- Confusion
- The patient is easily distracted

The patient may be getting too much oxygen if you notice these signs:

- Headaches
- Slurred speech
- Sleepiness or difficulty waking up
- Shallow, slow breathing

If any of these signs develop, call your supervisor or a nurse or doctor immediately. And — above all — never change the oxygen flow rate unless a licensed medical professional tells you to do so.

