

# The Respiratory System

Chapter 17 Lesson 3

# Functions of the Respiratory System

- **Respiration-** *the exchange of gasses between your body and your environment.*
- Two main parts: external respiration-the exchange of oxygen and carbon dioxide between the blood and the air in lungs; and internal respiration- the exchange of gases between the blood and the cells in your body.
- Without these two types of respiration taking place, you could only live for a few minutes.

# Structure of the Respiratory System

- The main structures of the respiratory system are the lungs and the structures within the nose and mouth.
- These structures are supported by the **diaphragm**- *a muscle that separates the chest and abdominal cavities.*
- *Without the diaphragm, respiration would be impossible.*

# The Lungs

- The lungs are the principal organ in the respiratory system functioning by taking oxygen from the air you inhale and returning carbon dioxide to the air when you exhale.
- Lungs rely on external muscle power to do their job.
- Lungs get their power from the diaphragm.

# The Breathing Process

- **When you inhale:** your rib muscles and diaphragm contract. The diaphragm moves downward, and the ribs are pulled upward and outward. This action enlarges the chest cavity, creating lower pressure in the lungs. Air rushes into the lungs to equalize the pressure between the lungs and the outside environment.
- **When you exhale:** the diaphragm relaxes, moving upward, and the ribs move inward, increasing the pressure within the lungs. Air moves from the higher pressure in the lungs, to the lower pressure of the outside environment.

# Structure of the Lungs

- Each lung is divided into sections called lobes.
- There are three lobes in the right lung and two in the left lung.
- The airways that lead into the lungs divide into a network of tubes called *bronchioles*.
- At the end of each bronchiole is a cluster of thin-walled air sacs called *alveoli*, covered with a vast network of capillaries.
- Thin walls of alveoli and capillaries allow the exchange of oxygen and carbon dioxide to take place.

# Other Respiratory Structures

- Air enters your lungs through two points of entry: the nose and the mouth.
- The nose is better suited for air intake than your mouth since the mucus membranes and tiny hair follicles in your nose called cilia trap dirt before it enters your lungs.
- From your nose, air moves through the **pharynx**-*throat*, and into the **trachea**-*windpipe*.
- Like the nose, the trachea is lined with mucus and cilia to trap dirt and foreign particles and prevent them from entering your lungs.
- Air then enters the **Bronchi**- *the airways that connect the trachea to the lungs*.

# The Larynx and the Epiglottis

- On its journey to your lungs, air passes over two structures that are not directly related to respiration.
- One of these is the **larynx-voice box**. The larynx contains two fibrous sheets of tissue known as vocal cords which vibrate to produce sound.
- Air also passes the epiglottis, a flap of cartilage in front of the entrance to the larynx. At rest the epiglottis is open to allow air to pass into the lungs. When you swallow, it closes to prevent food and liquid from being inhaled.



# Care of the Respiratory System

- The respiratory system is highly susceptible to infection from both bacteria and viruses. To reduce the risk of infection avoid putting your hands up to your nose and mouth.
- The respiratory system is highly sensitive to pollutants such as tobacco smoke. Avoid polluted air.
- A regular exercise program helps to strengthen the lungs and keep other parts of the respiratory system clear.

# Respiratory System Problems

- **Bronchitis**- an inflammation of the bronchi. Main symptoms are wheezing and shortness of breath.
- Bronchitis can be either acute or chronic.
- Acute bronchitis comes on suddenly and clears up in a short time.
- Chronic bronchitis is a longer lasting, recurring disease that can get progressively worse.

# Respiratory System Problems cont.

- **Asthma-** *an inflammatory condition in which the small airways to the lungs called bronchioles become narrowed, causing difficulty breathing.*
- The mucus lining swells and secretions build up, making breathing even more difficult. This can be triggered by exertion, emotion, infection, allergens, and even changes in the weather.
- Asthma attacks are treated with bronchodilators- medications that relax and widen the airways.

# Respiratory System Problems cont.

- **Pneumonia**- an inflammation of the lungs. Pneumonia is not a single disease but the name for several types of lung inflammations caused by infectious organisms such as bacteria, and viruses.
- Two main types: lobar pneumonia, and bronchial pneumonia.
- In lobar, one lobe of one lung is affected first.
- In bronchi, inflammation starts in the bronchi and spreads to the lungs.
- Chest pain accompanied with pneumonia is called **pleurisy**- *an inflammation of the membrane lining the lungs and chest cavity.*

# Respiratory System Problems cont.

- **Tuberculosis-** an infectious bacterial disease of the lungs.
- Symptoms include fever and sweating, weakness, poor appetite, shortness of breath, and severe coughing.
- Rare in developed countries like the US due to antibiotic medicines, resistant forms of the disease have recently become more prevalent.

# Respiratory System Problems cont.

- **Emphysema**- a disease in which the alveoli in the lungs burst and blend to form fewer, larger sacs with less surface area.
- The normal exchange of oxygen and carbon dioxide is disrupted.
- Symptoms include difficulty breathing and chronic cough.
- In almost all cases emphysema is caused by cigarette smoking.
- This condition cannot be reversed.

# Respiratory System Problems cont.

- **Sinusitis**- an inflammation of the membrane lining the facial sinuses, the air filled cavities of the bones that surround the nose.
- Symptoms include fever, stuffy nose, and a throbbing ache in the affected area.
- Antibiotic medications, decongestant drops or spray, and steam inhalation are used to treat sinusitis.