# CHAPTER - 4

**HUMAN RESPIRATORY SYSTEM**

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4. HUMAN RESPIRATORY SYSTEM

4.1 Respiration

For survival of human beings it is necessary that fresh oxygen is to be supplied to the internal parts of human anatomy. The amount of oxygen required for the efficient functioning of the human anatomy is to be supplied from outside, while simultaneously the carbon dioxide is to be transported out from the human body. The process of supplying fresh oxygen to the internal anatomy tissues and transporting the carbon dioxide from these tissues is known as respiration.

The process of respiration is combination of two processes namely inhale and exhale. The inhaling is the process of supplying fresh oxygen to tissues and the exhaling is process of exhausting carbon dioxide from internal anatomy. The total process of respiration is executed by respiratory system, which is biological technique of human anatomy that inhales oxygen and exhales carbon dioxide from human body.

The pictorial representation of the respiratory system of human beings is as shown below
4.2 Anatomy of human respiratory system

It consists of the following:

i) Lungs

ii) Diaphragm

iii) Bronchi

iv) Trachea

i) Lungs:

Lungs are the important organs of respiratory system. With the help of lungs, oxygen is taken inside the body and carbon dioxide is sent out from the body. The red blood cells will collect oxygen from the lungs and passes it to all the body cells which are in need. The same red blood cells collect carbon dioxide from the body cells and transfer it back to the lungs. From the lungs the carbon dioxide is breathed out when
human being exhale and oxygen is breathed in when human being inhale.

ii) Diaphragm:

A dome-shaped muscle which is present at the bottom of the lungs used for breathing is called as Diaphragm. When human being breathes in, the diaphragm flattens. By this way, the air is pulled into the lungs. When a person breathes out, the diaphragm enlarges. By this way, the air is forced out from the lungs.

iii) Trachea:

The trachea is known as wind pipe; which is used to purify the air inhaled and pumps it to the bronchi.

iv) Bronchi:

The two air tubes carries oxygen directly into the lungs by branching away from the trachea. In the case of air breathing vertebrates, respiration is carried out through the lungs. In the case of fish and in other invertebrates, respiration is carried out through the gills. In the case of plants, respiration takes place through photosynthesis process.

Functions of Respiratory system:

1. It supplies oxygen and removes carbon dioxide.
2. It controls the concentration of hydrogen ions.
3. It fights against microbes.
4. It influences arterial concentration.
5. It liquefies blood clots.

4.3 Organization of the Respiratory System
Respiratory system consists of two lungs namely right and left lungs. Each is divided into multiple lobes. The adjective pulmonary refers to the lungs. Gas exchange with the blood takes place at the place known as alveoli. Airways are the tubes that allow air exchange between the alveoli and outside environment. Inhalation refers to the process of transferring air from outside to the alveoli through airways. Exhalation refers to the process of transferring air from alveoli to outside through airways. The combination of inhalation and exhalation is called respiration cycle.

4.4 Respiratory rate

Respiration rate of a human being can be measured by counting the number of times the chest expands per minute. It is measured in breaths per minute. When a person gets older, respiratory rate will slow down and it will rises when a human being performs exercise. Respiratory rate is one of the parameter for measuring the health condition of the patients in hospital.

In 1993, Fieselmann and colleagues stated that a respiratory rate of higher than 27 breaths per minute leads to cardiac arrest [46]. In unhealthy patients, the relative change of respiratory rate will be high compared to change in heart rate. Hence the respiratory rate is a better means of discriminating healthy and unhealthy persons. The respiratory rate will be different for different age groups. Respiratory rate of babies from birth to six months will be 30 to 60 breaths per minute. As the age increases, respiratory rate decreases. Respiratory rate of children from one to five years old will be 20 to 30 breaths per minute, while from six to twelve years it will
be 12 to 20 breaths per minute. The normal respiratory rate for adults and children above 12 years of age will be 14 to 18 breaths per minute.

4.5 Respiratory rate measurement methods

a. Simple method:

In this method, Respiration rate of a human being can be measured by counting the number of times the chest expands per minute. It is measured in breaths per minute. The factors that affect the respiratory rate are temperature, illness etc.

b. Stethoscope:

It is a device used for listening the internal sounds of a human body. It is also used for listening breathing, heart sounds and flow of blood in arteries and veins. It can also be used for measuring the rapid changes in respiratory rates of babies.

c. Strain gauge:

It is a device which goes around the chest, if chest enlarges it pulls on the guage. Respiration changes with the change in diastolic and systolic stress.