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Physiology of Respiration, Diseases and disorder and treatment of Respiratary System- A Review article

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Abstract:

This Paper describes the physiological function of the respiratory system which includes mechanics of breathing, lung function test and interpretation, exchange and transport of gases, ventilation/perfusion in the lungs, regulation of respiration and acclimatization to higher and lower altitude in our human body. In this paper we describes the various Respiratory Diseases and disorder along with their management and Treatment. The entire learning outcomes specified for each subtopic are provided as student read through each chapter. This textbook is also written in such way that it is simple and easy for the students to comprehend. All illustrations are specially hand drawn and coloured to explain the main ideas discussed in each chapter. In this paper we studies History and background of Repiratory dieases in Ancient, various Diseases like Asthma, Brochities, COPD, Lung cancer, Shorthness of Breathing, their safty anf management, control, and various homeremedies.

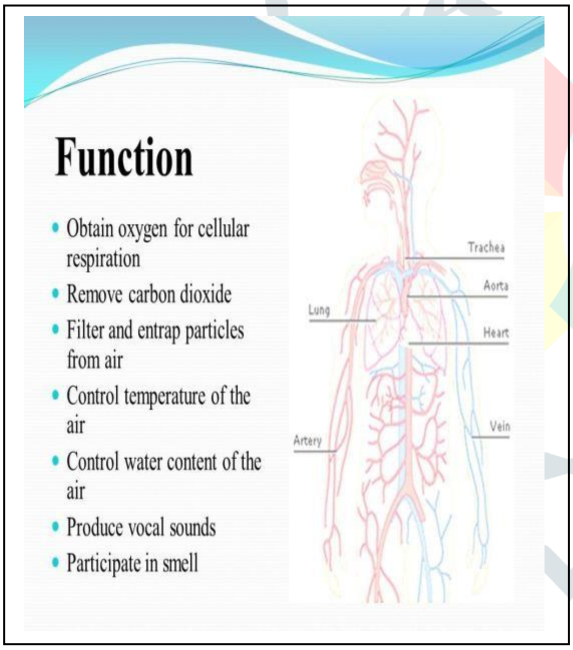
Keywords. Physiology of Respiration, Breathing, Pathway of air, Lung capisity, Various dieases, Prevention and management.

1. History and Background

Unani Tibb is one of the ancient systems of medicine of which many believe modern system of medicine has evolved. Greek/ Ionian is translated as Unani and Medicine as Tibb in Arabic. It can be defined as that system of Greek medicine which developed during Arab civilization. observes that "Muslims still call it Unani gratefully acknowledging its place of origin whereas European historians would call it Arabic Medicine or Geeko-Arabic medicine". Presently, it has been widely practiced in India and Indian subcontinent. Tibb has never been static and journeyed through various continents and chronology, Ibn-e-Sina, popularly known a Avicenna (980-1037AD) is considered as immortal along with other scholars who contributed to the system such as Aesculapeus (8^{th} century BC), Pythagorous (580-489 BC),Aristotle (384-322 BC), Hippocrate (460-370 BC), Discorides (70 AD) Galen (131–210 AD), Ibne Raban Tabari (810–895 AD), Abu Bakar Zarakariya Razi popularly known as 'Rhazes' (865–925 AD), Jabir bin Hayyan (717–813 AD). Ibn-e-Sina is the author of world known famous book on fundamental treatise of Unani Medicine in five volume populary known as AlQanoon-fit-Tibb (Canon of Medicine).In India, pointed out that Unani medicine was introduced in 1351 AD by Arabs and flourished under the patronage of Mughal Emperors among the masses and spread all over the country. It suffered a setback during the British rule but soon regained its momentum by endless efforts of Nizam of Hyderabad, Azizi family of Lucknow and Sharifi family of Delhi. At present Unani system of medicine has now been regarded and recognized as one of the Indian systems of medicine and forms an integral part of national healthcare delivery system.

2. Physiology of Respiratory System

The Respiratory System is crucial to every human being. Without it, we would cease to live outside of the womb. Let us begin by taking a look at the structure of the respiratory system and how vital it is to life. During inhalation or exhalation air is pulled towards or away from the lungs, by several cavities, tubes, and openings. The organs of the respiratory system make sure that oxygen enters our bodies and carbon dioxide leaves our bodies.



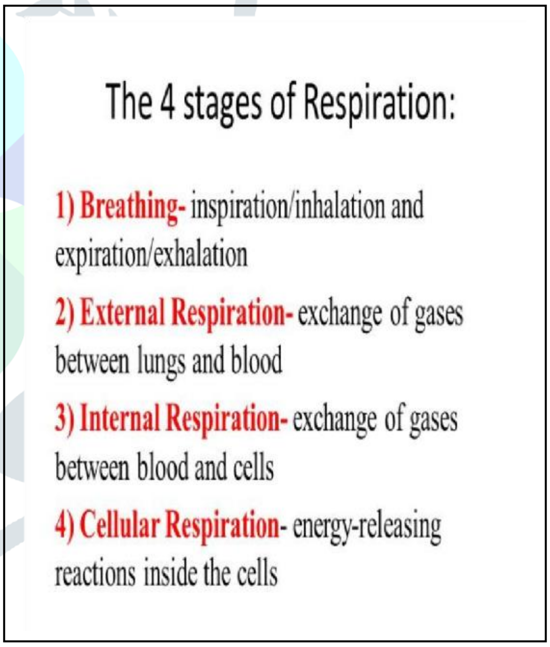


Fig. 1 Function of Re

Fig. 2 Stages of Respiration

The respiratory tract is the path of air from the nose to the lungs. It is divided into two sections: Upper Respiratory Tract and the Lower Respiratory Tract. Included in the upper respiratory tract are the Nostrils, Nasal Cavities, Pharynx, Epiglottis, and the Larynx. The lower respiratory tract consists of the Trachea, Bronchi, Bronchioles, and the Lungs.

As air moves along the respiratory tract it is warmed, moistened and filtered.

I. Functions

In this chaper we will discuss the four processes of respiration. They are:

A. **Breathing** or ventilation

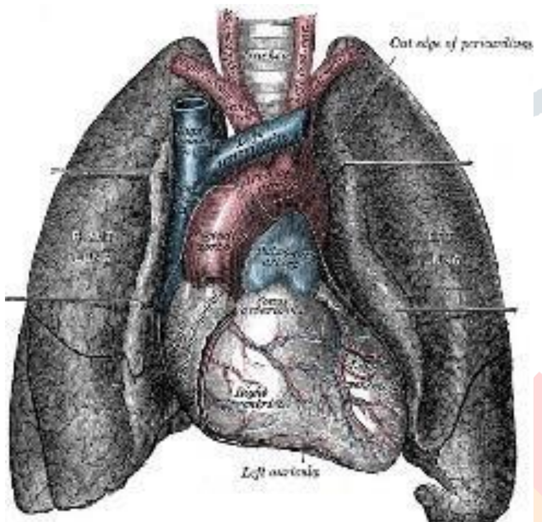
B. **External Respiration**, which is the exchange of gases (oxygen and carbon dioxide) between inhaled air and the blood.

C. **Internal Respiration**, which is the exchange of gases between the blood and tissue fluids.

D. **Cellular Respiration**

In addition to these main processes, the respiratory system serves for:

- Regulation Of Blood pH, which occurs in coordination with the kidneys, and as a
- 'Defense Against Microbes
- Control of body temperature due to loss of evaporate during expiration



The **lungs** flank the heart and great vessels in the chest cavity. (Source: *Gray's Anatomy of the Human Body*, 20th ed. 1918.)

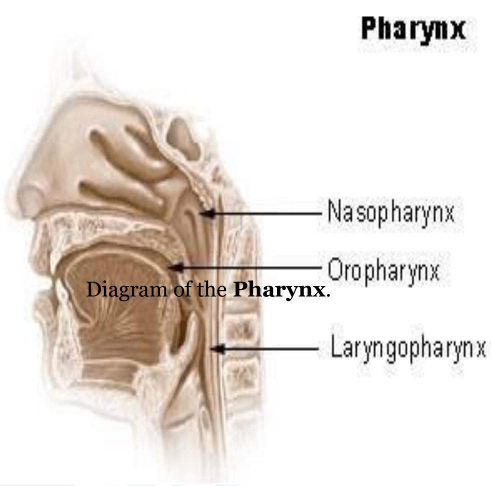


Diagram of the **Pharynx**.

Fig. 3 Anatomy and locat

Fig. 4 Anatomy of Pharynx

II. Breathing and Lung Mechanics

Ventilation is the exchange of air between the external environment and the alveoli. Air moves by bulk flow from an area of high pressure to low pressure. All pressures in the respiratory system are relative to atmospheric pressure (760mmHg at sea level). Air will move in or out of the lungs depending on the pressure in the alveoli. The body changes the pressure in the alveoli by changing the volume of the lungs. As volume increases pressure decreases and as volume decreases pressure increases. There are two phases of ventilation; inspiration and expiration. During each phase the body changes the lung dimensions to produce a flow of air either in or out of the lungs.

The body is able to change the dimensions of the lungs because of the relationship of the lungs to the thoracic wall. Each lung is completely enclosed in a sac called the pleural sac. Two structures contribute to the formation of this sac. The parietal pleura is attached to the thoracic wall where as the visceral pleura is attached to the lung itself.

In-between these two membranes is a thin layer of intrapleural fluid. The intrapleural fluid completely surrounds the lungs and lubricates the two surfaces so that they can slide across each other.

Changing the pressure of this fluid also allows the lungs and the thoracic wall to move together during normal breathing. Much the way two glass slides with water in-between them are difficult to pull apart, such is the relationship of the lungs to the thoracic wall.

The rhythm of ventilation is also controlled by the "Respiratory Center" which is located largely in the medulla oblongata of the brain stem. This is part of the autonomic system and as such is not controlled voluntarily (one can increase or decrease breathing rate voluntarily, but that involves a different part of the brain). While resting, the respiratory center sends out action potentials that travel along the phrenic nerves into the diaphragm and the external intercostal muscles of the rib cage, causing inhalation.

III. The Pathway of Air

When one breathes air in at sea level, the inhalation is composed of different gases. These gases and their quantities are Oxygen which makes up 21%, Nitrogen which is 78%, Carbon Dioxide with 0.04% and others with significantly smaller portions.

In the process of breathing, air enters into the nasal cavity through the nostrils and is filtered by coarse hairs (**vibrissae**) and mucous that are found there. The vibrissae filter macroparticles, which are particles of large size. Dust, pollen, smoke, and fine particles are trapped in the mucous that lines the **nasal cavities** (hollow spaces within the bones of the skull that warm, moisten, and filter the air). There are three bony projections inside the nasal cavity. The superior, middle, and inferior nasal conchae. Air passes between these conchae via the nasal meatuses.

Air then travels past the nasopharynx, oropharynx, and laryngopharynx, which are the three portions that make up the pharynx. The pharynx is a funnel-shaped tube that connects our nasal and oral cavities to the larynx. The tonsils which are part of the lymphatic system, form a ring at the connection of the oral cavity and the pharynx. Here, they protect against foreign invasion of antigens. Therefore the respiratory tract aids the immune system through this protection. Then the air travels through the larynx. The larynx closes at the epiglottis to prevent the passage of food or drink as a protection to our trachea and lungs. The larynx is also our voicebox; it contains vocal cords, in which it produces sound. Sound is produced from the vibration of the vocal cords when air passes through them.

The trachea, which is also known as our windpipe, has ciliated cells and mucous secreting cells lining it, and is held open by C-shaped cartilage rings. One of its functions is similar to the larynx and nasal cavity, by way of protection from dust and other particles. The dust will adhere to the sticky mucous and the cilia helps propel it back up the trachea, to where it is either swallowed or coughed up.

Inspiration is initiated by contraction of the diaphragm and in some cases the intercostals muscles when they receive nervous impulses. During normal quiet breathing, the phrenic nerves stimulate the diaphragm to contract and move downward into the abdomen. This downward movement of the diaphragm enlarges the thorax. When necessary, the intercostal muscles also increase the thorax by contacting and drawing the ribs upward and outward.

As the diaphragm contracts inferiorly and thoracic muscles pull the chest wall outwardly, the volume of the thoracic cavity increases. The lungs are held to the thoracic wall by negative pressure in the pleural cavity, a very thin space filled with a few milliliters of lubricating pleural fluid. The negative pressure in the pleural cavity is enough to hold the lungs open in spite of the inherent elasticity of the tissue. Hence, as the thoracic cavity increases in volume the lungs are pulled from all sides to expand, causing a drop in the pressure (a partial vacuum) within the lung itself (but note that this negative pressure is still not as great as the negative pressure within the pleural cavity--otherwise the lungs would pull away from the chest wall). Assuming the airway is open, air from the external environment then follows its pressure gradient down and expands the alveoli of the lungs, where gas exchange with the blood takes place.

IV. Expiration

During quiet breathing, expiration is normally a passive process and does not require muscles to work. When the lungs are stretched and expanded, stretch receptors within the alveoli send inhibitory nerve impulses to the medulla oblongata, causing it to stop sending signals to the rib cage and diaphragm to contract. The muscles of respiration and the lungs themselves are elastic, so when the diaphragm and intercostal muscles relax there is an elastic recoil, which creates a positive pressure (pressure in the lungs becomes greater than atmospheric pressure), and air moves out of the lungs by flowing down its pressure gradient.

Although the respiratory system is primarily under involuntary control, and regulated by the medulla oblongata, we have some voluntary control over it also. This is due to the higher brain function of the cerebral cortex.

When under physical or emotional stress, more frequent and deep breathing is needed, and both inspiration and expiration will work as active processes. Additional muscles in the rib cage forcefully contract and push air quickly out of the lungs. In addition to deeper breathing, when coughing or sneezing we exhale forcibly. Our abdominal muscles will contract suddenly, raising the abdominal pressure. The rapid increase in pressure pushes the relaxed diaphragm up against the pleural cavity. This causes air to be forced out of the lungs.

Another function of the respiratory system is to sing and to speak. By exerting conscious control over our breathing and regulating flow of air across the vocal cords we are able to create and modify sounds.

V. Lung Compliance

Lung Compliance is the magnitude of the change in lung volume produced by a change in pulmonary pressure. Compliance can be considered the opposite of stiffness. A low lung compliance would mean that the lungs would need a greater than average change in intrapleural pressure to change the volume of the lungs. A high lung compliance would indicate that little pressure difference in intrapleural pressure is needed to change the volume of the lungs. More energy is required to breathe normally in a person with low lung compliance. Persons with low lung compliance due to disease therefore tend to take shallow breaths and breathe more frequently.

Determination of Lung Compliance Two major things determine lung compliance. The first is the elasticity of the lung tissue. Any thickening of lung tissues due to disease will decrease lung compliance. The second is surface tensions at air water interfaces in the alveoli. The surface of the alveoli cells is moist. The attractive force, between the water cells on the alveoli, is called surface tension. Thus, energy is required not only to expand the tissues of the lung but also to overcome the surface tension of the water that lines the alveoli.

VI. Control of respiration

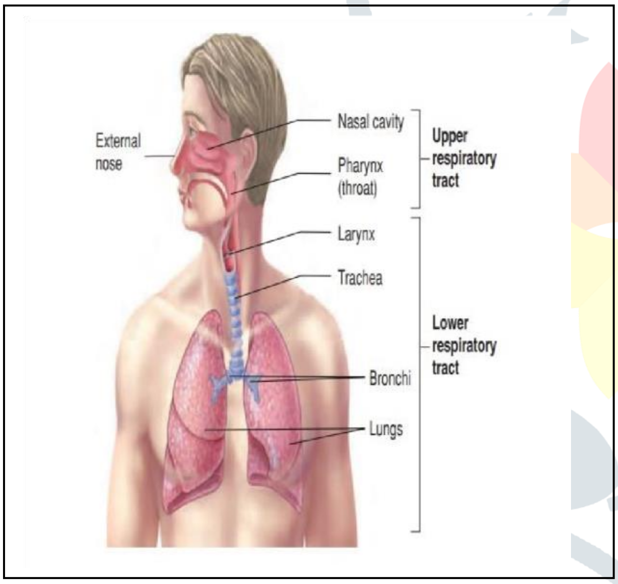
Respiratory System: Upper and Lower Respiratory Tracts

For the sake of convenience, we will divide the respiratory system in to the upper and lower respiratory tracts:

A. Upper Respiratory Tract

The upper respiratory tract consists of the nose and the pharynx. Its primary function is to receive the air from the external environment and filter, warm, and humidify it before it reaches the delicate lungs where gas exchange will occur.

Air enters through the nostrils of the nose and is partially filtered by the nose hairs, then flows into the nasal cavity. The nasal cavity is lined with epithelial tissue, containing blood vessels, which help warm the air; and secrete mucous, which further filters the air. The endothelial lining of the nasal cavity also contains tiny hairlike projections, called cilia. The *cilia* serve to transport dust and other foreign particles, trapped in mucous, to the back of the nasal cavity and to the pharynx. There the mucus is either coughed out, or swallowed and digested by powerful stomach acids. After passing through the nasal cavity, the air flows down the pharynx to the larynx.



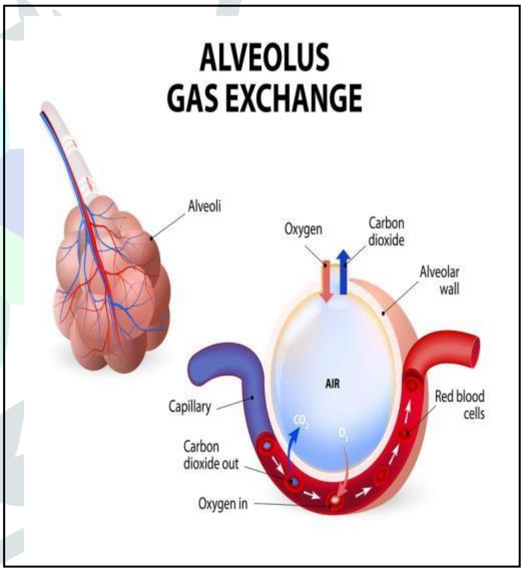


Fig. 5 Upper and lower Respiratory Tract

Fig. 6 Alveolus Gas Exchange

B. Lower Respiratory Tract

The lower respiratory tract starts with the larynx, and includes the trachea, the two bronchi that branch from the trachea, and the lungs themselves. This is where gas exchange actually takes place. The larynx (plural larynges), colloquially known as the voice box, is an organ in our neck involved in protection of the trachea and sound production. The larynx houses the vocal cords, and is situated just below where the tract of the pharynx splits into the trachea and the esophagus. The larynx contains two important structures: the epiglottis and the vocal cords.

The epiglottis is a flap of cartilage located at the opening to the larynx. During swallowing, the larynx (at the epiglottis and at the glottis) closes to prevent swallowed material from entering the lungs;

the larynx is also pulled upwards to assist this process. Stimulation of the larynx by ingested matter produces a strong cough reflex to protect the lungs. Note: choking occurs when the epiglottis fails to cover the trachea, and food becomes lodged in our windpipe.

The vocal cords consist of two folds of connective tissue that stretch and vibrate when air passes through them, causing vocalization. The length the vocal cords are stretched determines what pitch the sound will have. The strength of expiration from the lungs also contributes to the loudness of the sound. Our ability to have some voluntary control over the respiratory system enables us to sing and to speak. In order for the larynx to function and produce sound, we need air. That is why we can't talk when we're swallowing.

1. Trachea
2. Bronchi
3. Lungs

VII. Homeostasis and Gas Exchange

Homeostasis is maintained by the respiratory system in two ways: gas exchange and regulation of blood pH. Gas exchange is performed by the lungs by eliminating carbon dioxide, a waste product given off by cellular respiration. As carbon dioxide exits the body, oxygen needed for cellular respiration enters the body through the lungs. ATP, produced by cellular respiration, provides the energy for the body to perform many functions, including nerve conduction and muscle contraction. Lack of oxygen affects brain function, sense of judgment, and a host of other problems.

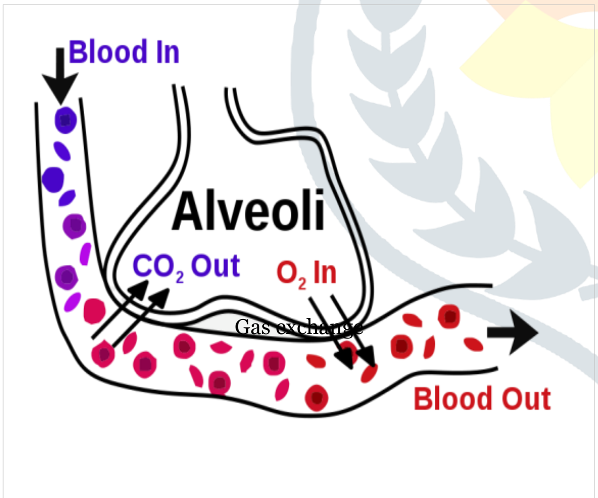


Fig. 7 Co2 and O2 Exchange

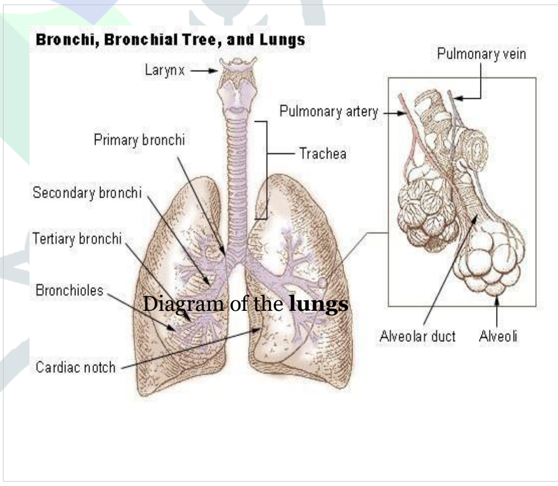


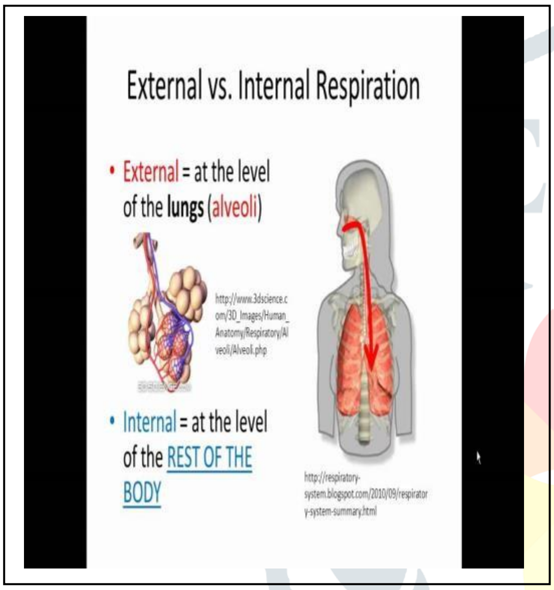
Fig. 8 Bronchi, Bronchial tube and lung

VIII. Gas Exchange

Gas exchange in the lungs and in the alveoli is between the alveolar air and the blood in the pulmonary capillaries. This exchange is a result of increased concentration of oxygen, and a decrease of C02

IX. External Respiration

External respiration is the exchange of gas between the air in the alveoli and the blood within the pulmonary capillaries. A normal rate of respiration is 12-25 breaths per minute. In external respiration, gases diffuse in either direction across the walls of the alveoli. Oxygen diffuses from the air into the blood and carbon dioxide diffuses out of the blood into the air. Most of the carbon dioxide is carried to the lungs **in plasma** as bicarbonate ions (HCO_3^-). When blood enters the pulmonary capillaries, the bicarbonate ions and hydrogen ions are converted to carbonic acid (H_2CO_3) and then back into carbon dioxide (CO_2) and water. This chemical reaction also uses up hydrogen ions. The removal of these ions gives the blood a more neutral pH, allowing hemoglobin to bind up more oxygen. De-oxygenated blood "blue blood" coming from the pulmonary arteries, generaly has an oxygen partial pressure (pp) of 40 mmHg and CO pp of 45 mmHg. Oxygenated blood leaving the lungs via the pulmonary veins has a O_2 pp of 100 mmHg and CO pp of 40 mmHg. It should be noted that alveolar O_2 pp is 105 mmHg, and not 100 mmHg. The reason why pulmonary venous return blood has a lower than expected O_2 pp can be explained by "Ventilation Perfusion Mismatch".



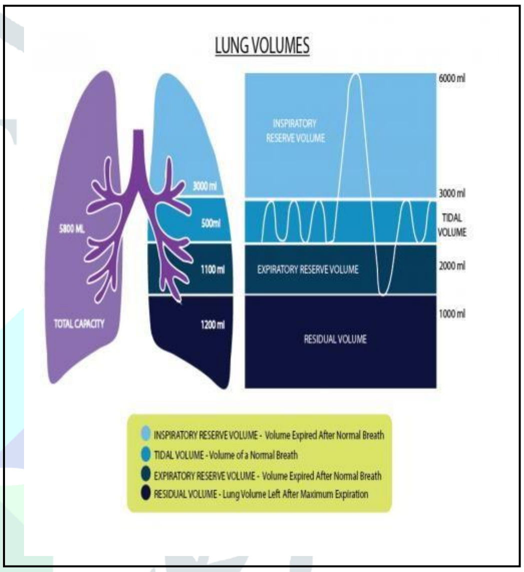


Fig. 9 External and Extrnal

Fig. 10 Lung capisity

X. Internal Respiration

Internal respiration is the exchanging of gases at the cellular level.

The Passage Way From the Trachea to the Bronchioles

There is a point at the inferior portion of the trachea where it branches into two directions that form the right and left primary bronchus. This point is called the Carina which is the keel-like cartilage plate at the division point. We are now at the Bronchial Tree. It is named so because it has a series of respiratory tubes that branch off into smaller and smaller tubes as they run throughout the lungs.

The Right Primary Bronchus is the first portion we come to, it then branches off into the Lobar (secondary) Bronchi, Segmental (tertiary) Bronchi, then to the Bronchioles which have little cartilage and are lined by simple cuboidal epithelium. The bronchi are lined by pseudostratified columnar epithelium. Objects will likely lodge here at the junction of the Carina and the Right Primary Bronchus because of the vertical structure. Items have a tendency to fall in it, where as the Left Primary Bronchus has more of a curve to it which would make it hard to have things lodge there.

The Left Primary Bronchus has the same setup as the right with the lobar, segmental bronchi and the bronchioles.

The lungs are attached to the heart and trachea through structures that are called the roots of the lungs. The roots of the lungs are the bronchi, pulmonary vessels, bronchial vessels, lymphatic vessels, and nerves. These structures enter and leave at the hilus of the lung which is "the depression in the medial surface of a lung that forms the opening through which the bronchus, blood vessels, and nerves pass".

There are a number of terminal bronchioles connected to respiratory bronchioles which then advance into the alveolar ducts that then become alveolar sacs. Each bronchiole terminates in an elongated space enclosed by many air sacs called alveoli which are surrounded by blood capillaries. Present there as well, are Alveolar Macrophages, they ingest any microbes that reach the alveoli. The Pulmonary Alveoli are microscopic, which means they can only be seen through a microscope, membranous air sacs within the lungs. They are units of respiration and the site of gas exchange between the respiratory and circulatory systems.

XI. Cellular Respiration

First the oxygen must diffuse from the alveolus into the capillaries. It is able to do this because the capillaries are permeable to oxygen. After it is in the capillary, about 5% will be dissolved in the blood plasma. The other oxygen will bind to red blood cells. The red blood cells contain hemoglobin that carries oxygen. Blood with hemoglobin is able to transport 26 times more oxygen than plasma without hemoglobin. Our bodies would have to work much harder pumping more blood to supply our cells with oxygen without the help of hemoglobin. Once it diffuses by osmosis it combines with the hemoglobin to form oxyhemoglobin.

It is in the mitochondria of the cells where oxygen is actually consumed and carbon dioxide produced. Oxygen is produced as it combines with hydrogen ions to form water at the end of the electron transport chain (see chapter on cells). As cells take apart the carbon molecules from glucose, these get released as carbon dioxide. Each body cell releases carbon dioxide into nearby capillaries by diffusion, because the level of carbon dioxide is higher in the body cells than in the blood. In the capillaries, some of the carbon dioxide is dissolved in plasma and some is taken by the hemoglobin, but most enters the red blood cells where it binds with water to form carbonic acid. It travels to the capillaries surrounding the lung where a water molecule leaves, causing it to turn back into carbon dioxide. It then enters the lungs where it is exhaled into the atmosphere.

XII. Lung Capacity

The normal volume moved in or out of the lungs during quiet breathing is called tidal volume. When we are in a relaxed state, only a small amount of air is brought in and out, about 500 mL. You can increase both the amount you inhale, and the amount you exhale, by breathing deeply. Breathing in very deeply is Inspiratory Reserve Volume and can increase lung volume by 2900 mL, which is quite a bit more than the tidal volume of 500 mL. We can also increase expiration by contracting our thoracic and abdominal muscles. This is called expiratory reserve volume and is about 1400 ml of air. Vital capacity is the total of tidal, inspiratory reserve and expiratory reserve volumes; it is called vital capacity because it is vital for life, and the more air you can move, the better off you are. There are a number of illnesses that we will discuss later in the chapter that decrease vital capacity. Vital Capacity can vary a little depending on how much we can increase inspiration by expanding our chest and lungs. Some air that we breathe never even reaches the lungs! Instead it fills our nasal cavities, trachea, bronchi, and bronchioles. These passages aren't used in gas exchange so they are considered to be dead air space. To make sure that the inhaled air gets to the lungs, we need to breathe slowly and deeply. Even when we exhale deeply some air is still in the lungs,(about 1000 ml) and is called residual volume. This air isn't useful for gas exchange. There are certain types of diseases of the lung where residual volume builds up because the person cannot fully empty the lungs. This means that the vital capacity is also reduced because their lungs are filled with useless air.

XIII. Stimulation of Breathing

There are two pathways of motor neuron stimulation of the respiratory muscles. The first is the control of voluntary breathing by the cerebral cortex. The second is involuntary breathing controlled by the medulla oblongata.

There are chemoreceptors in the aorta, the carotid body of carotid arteries, and in the medulla oblongata of the brainstem that are sensitive to pH. As carbon dioxide levels increase there is a buildup of carbonic acid, which releases hydrogen ions and lowers pH. Thus, the chemoreceptors do not respond to changes in oxygen levels (which actually change much more slowly), but to pH, which is dependent upon plasma carbon dioxide levels. In other words, CO2 is the driving force for breathing. The receptors in the aorta and the carotid sinus initiate a reflex that immediately stimulates breathing rate and the receptors in the medulla stimulate a sustained increase in breathing until blood pH returns to normal.

This response can be experienced by running a 100 meter dash. During this exertion (or any other sustained exercise) your muscle cells must metabolize ATP at a much faster rate than usual, and thus will produce much higher quantities of CO2. The blood pH drops as CO2 levels increase, and you will involuntarily increase breathing rate very soon after beginning the sprint. You will continue to breathe heavily after the race, thus expelling more carbon dioxide, until pH has returned to normal.
Metabolic acidosis therefore is acutely corrected by respiratory compensation (hyperventilation).

IVX. Regulation of Blood pH

Many of us are not aware of the importance of maintaining the acid/base balance of our blood. It is vital to our survival. Normal blood pH is set at 7.4, which is slightly alkaline or "basic". If the pH of our blood drops below 7.2 or rises above 7.6 then very soon our brains would cease functioning normally and we would be in big trouble. Blood pH levels below 6.9 or above 7.9 are usually fatal if they last for more than a short time. Another wonder of our amazing bodies is the ability to cope with every pH change – large or small. There are three factors in this process: the lungs, the kidneys and buffers.

So what exactly is pH? pH is the concentration of hydrogen ions (H+). Buffers are molecules which take in or release ions in order to maintain the H+ ion concentration at a certain level. When blood pH is too low and the blood becomes too acidic (acidosis), the presence of too many H+ ions is to blame. Buffers help to soak up those extra H+ ions. On the other hand, the lack of H+ ions causes the blood to be too basic (alkalosis). In this situation, buffers release H+ ions. Buffers function to maintain the pH of our blood by either donating or grabbing H+ ions as necessary to keep the number of H+ ions floating around the blood at just the right amount.

The most important buffer we have in our bodies is a mixture of carbon dioxide (CO_2) and bicarbonate ion (HCO_3). CO_2 forms carbonic acid (H_2CO_3) when it dissolves in water and acts as an acid giving up hydrogen ions (H+) when needed. HCO_3 is a base and soaks up hydrogen ions (H+) when there are too many of them. In a nutshell, blood pH is determined by a balance between bicarbonate and carbon dioxide.

Bicarbonate Buffer System. With this important system our bodies maintain homeostasis. (Note that H_2CO_3 is Carbonic Acid and HCO_3 is Bicarbonate) $CO_2 + H_2O \leftrightarrow H_2CO_3 \leftrightarrow (H^+) + HCO_3$

1. If pH is too high, carbonic acid will donate hydrogen ions (H+) and pH will drop.
2. If pH is too low, bicarbonate will bond with hydrogen ions (H+) and pH will rise.

Too much CO_2 or too little HCO_3 in the blood will cause acidosis. The CO_2 level is increased when hypoventilation or slow breathing occurs, such as if you have emphysema or pneumonia. Bicarbonate will be lowered by ketoacidosis, a condition caused by excess fat metabolism (diabetes mellitus).

Too much HCO_3 or too little CO_2 in the blood will cause alkalosis. This condition is less common than acidosis. CO_2 can be lowered by hyperventilation. So, in summary, if you are going into respiratory acidosis the above equation will move to the right. The body's H+ and CO_2 levels will rise and the pH will drop. To counteract this the body will breathe more and release H+. In contrast, if you are going into respiratory alkalosis the equation will move to the left. The body's H+ and CO_2 levels will fall and the pH will rise. So the body will try to breathe less to release HCO_3.

You can think of it like a leak in a pipe: where ever there is a leak, the body will "fill the hole".

3. Diagnosis and treatments for respiratory and lung disorders

Treatments for lung and breathing disorders will depend on the severity and sometimes root cause of the disease. Our team of specialists will work closely with you to develop an individualized treatment plan.

A. **Asthma:** The most common treatment for asthma is rescue and controller inhalers, but other treatments and medications can be used. Doctors also recommend patients identify and reduce asthma triggers. Common triggers include allergies, viruses, exercise, cold weather and fumes. Patients are also often taught skills to monitor and manage their asthma. “Asthma” is a Greek word derived from the verb “aazein” which means to exhale with open mouth and to pant.

Buqraat (Hippocrates- a Greek physician) was the first to name this disease as ‘panting’ which means breathlessness. Later on many Unani scholars keenly studied about Asthma and mentioned it in their books. Zeeq-un- nafas sho’abi (Bronchial Asthma) is a chronic lung disease characterized by episodes of acute bronchoconstriction causing shortness of breath, cough, chest tightness, rapid respirations and wheezing (appreciated on auscultation of the chest is the most common physical finding).

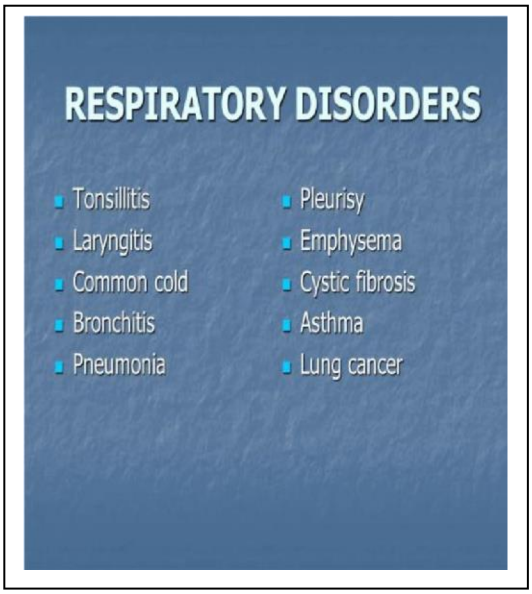
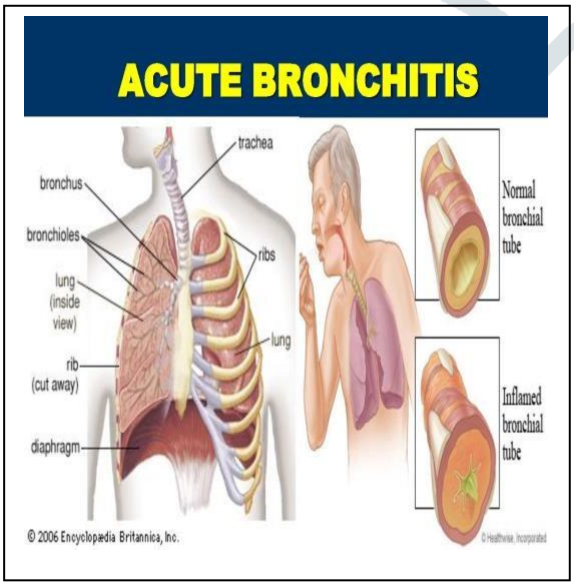


Fig. 11 Asthma . Inflamed B

Fig. 12 Various Respiratory Disorder

In other words it is chronic inflammation of the bronchial tubes (airways) that cause swelling and narrowing (constriction) of the airways. It is a disease that affects the lungs by allergies or infections resulting in narrowing of airways which causes difficulty in breathing and cough. It is a well-known hypersensitivity disorder characterized by ventilator insufficiency. In many asthma patients, timing of the symptoms of disease is closely related to physical activity. Even, some healthy people can develop asthma like symptoms only when exercising. This is called exercise-induced asthma (EIA) or exercise-induced bronchoconstriction (EIB). The disease is influenced by multiple genetic developmental and environmental factors. It affects over 300 million people around the world. One in every four urban children is asthmatic. Current estimates suggest that 300 million people worldwide suffer from Bronchial Asthma and in addition 100 million may be diagnosed with Bronchial Asthma by 2025. An increasing prevalence and severity of asthma has been reported worldwide.



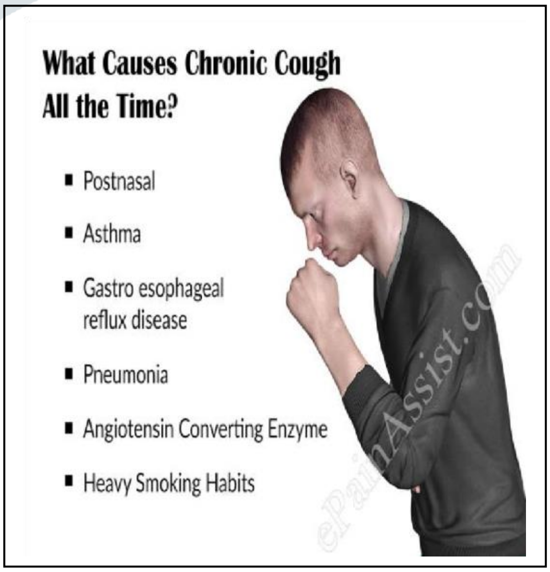


Fig.13 Acute Bronchitis

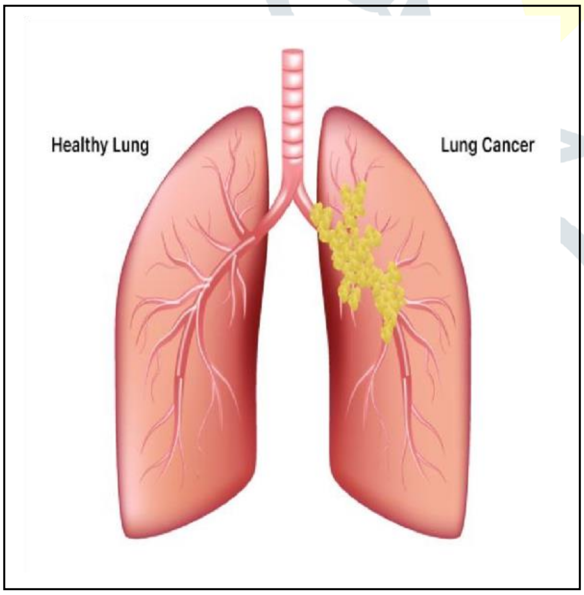
Fig. 14 Chronic cough

B. Chronic bronchitis.

Chronic bronchitis is defined epidemiologically as cough and sputum production for ⩾3 months in each of least two consecutive years. Chronic bronchitis is an important public health problem worldwide. The median prevalence of chronic bronchitis was 2.6% across countries. It affects about a third of patients with chronic obstructive pulmonary disease (COPD), but also occurs in individuals with normal lung function, with prevalence estimates varying widely both in populationbased studies (2.6–16%) and among COPD patients (7.4–53%). Reported risk factors for chronic bronchitis include tobacco smoke, indoor and outdoor air pollution and occupational exposures. The association between smoking and chronic bronchitis is well known. The term *Waram-e-Shoab* muzmin in Unani classicalliterature has not been mentioned as such. The contemporary Unani authors adopted this term and correlated it with various diseased conditions like *Sual* or *Surfa*. *Sual* is described as a disease in Unani literature but in modern medicine it is described as one of the symptom of respiratory disease. Most of the Unani physicians have broadly divided Sual into dry and productive cough. According to Ibn

Sina , Jurjani and Azam Khan dry cough (*Sual sadah*) is produced by Su-e-Mizaj sadah (Simple dystemperament) and productive cough (Sual maddi) is produced by *Su-e- Mizaj* maddi (Dystemperament with matter).

C. Chronic Cough: Some of the tests that may be used to diagnose the cause of a chronic cough may include a chest X-ray and other radiology tests, breathing tests, pH monitoring, swallow tests and upper GI endoscopy if reflux is associated with the cough. The treatment of chronic cough is usually directed at its cause. Our specialists can help determine your best options for treatment.



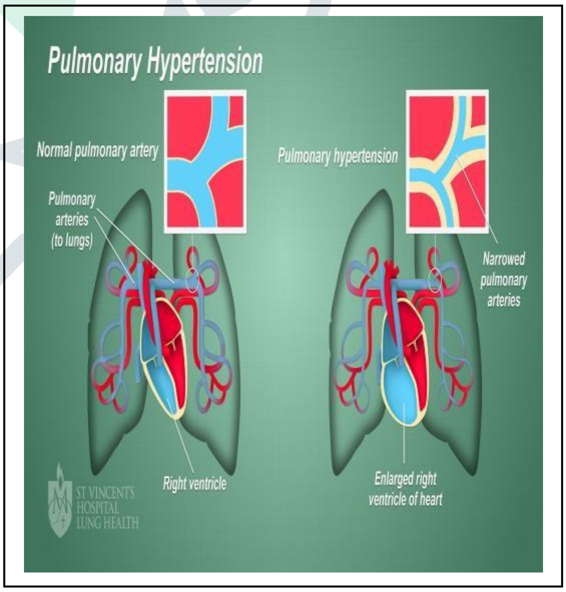


Fig. 15 Lung cancer

Fig. 16 Pulmonary Hypotension.

D. Chronic Obstructive Pulmonary Disease (COPD): The most common cause of COPD is smoking, although breathing in pollutants, dust or chemicals can also be the cause. For smokers, smoking cessation can help prevent the disease or keep it from getting worse. COPD can also be treated with inhalers, medications, oxygen therapy and pulmonary rehab. In severe cases, surgery may be an option.

E. **Lung Cancer:** Lung cancer is diagnosed with a tissue sample or biopsy to determine the kind of cancer. The diagnosis is most commonly made by bronchoscopy or needle biopsy.

Treatment of lung cancer depends on the type of cancer, the stage, the location and whether the cancer has spread. Treatment may include surgery, chemotherapy and/or radiation.

F. **Lung Nodules:** Lung nodules are often found when tests are being done for another reason. Diagnostic tests include:

- Bronchoscopy
- Electromagnetic navigation bronchoscopy
- PET scan/CT scan
- Needle biopsy through the chest wall
- Surgical lung biopsy

G. **Pulmonary Hypertension:** A series of tests may be needed to diagnosis pulmonary hypertension such as:

- Pulmonary function tests
- Chest X-rays, lung perfusion scans and other film studies
- Six-minute walk test
- Blood tests
- ECG (EKG)
- Echocardiogram

There is no cure but there are treatment options to try to reduce the symptoms, slow the progression and improve quality of life. If pulmonary hypertension is the side effect of another illness, treatment focuses on the primary cause. If pulmonary hypertension is the primary cause, medications can be used.

H. **Shortness of Breath:** Diagnostic tests may include pulmonary function tests, chest X-ray, EKG, echocardiogram, bronchoscopy, blood tests or chest CT scan. Treatment for shortness of breath depends on the underlying cause and severity.

I. **Pulmonary Rehabilitation:** Pulmonary rehab is for people with chronic breathing conditions that limit quality of life. Gundersen exercise physiologists and respiratory therapists help you set goals, establish a safe exercise routine and learn how to exercise at home. To learn if you are a good candidate for pulmonary rehab, talk with your primary care provider. You'll need a referral to participate. While most health insurance covers pulmonary rehab, you should also check with your health insurance carrier before you begin.

J. **Tobacco Cessation:** Smoking is a leading cause of preventable respiratory and lung disease. Quitting smoking is the most important thing you can do to live a longer, healthier life. You don't have to quit smoking alone. Our smoking and tobacco cessation program can provide support. You can also call the quit line at (800) QUIT-NOW for free support.

Treatments of Respiratory diseases.

Depending on your respiratory condition, medications can include an assortment of inhalers, oral drugs and intravenous treatments. Your doctor should explain why specific medications are prescribed, and their potential benefits and side effects. Some examples include, by condition:

A. **Asthma.** Inhalers and nebulizers are key components of asthma treatment. Long-term asthma control medications include inhaled corticosteroids, leukotriene modulators (like Singulair) that prevent asthma symptoms, theophylline, and long-term beta agonists, or LABAs, that relax airway muscles (like Serevent). Combination inhalers include both a LABA and corticosteroid. Quickrelief or rescue asthma medications provide rapid, short-term symptom relief during asthma flares. Albuterol and Atrovent are types of inhaled rescue drugs. Oral and IV steroids may be prescribed on a short-term basis to treat severe asthma symptoms.
B. **COPD.** A wide range of inhalers, nebulizers, oral medications and injections are used to treat COPD, depending on severity and symptoms. Clinicians use guidelines from the Global Initiative for Chronic Obstructive Lung Disease, known as the GOLD guidelines, to prescribe COPD medications.
C. **Idiopathic pulmonary fibrosis.** Two oral medications are currently approved by the Food and Drug Administration to treat idiopathic pulmonary fibrosis: pirfenidone (Esbriet) and nintedanib (Ofev).
D. **Alpha-1 antitrypsin deficiency.** "Drugs are available where we functionally give people back alpha-1 antitrypsin," Kuhn says. "And you're actually able to augment their deficiency to some degree." Augmentation therapy involves a weekly IV infusion, which some patients learn to manage at home.
E. **Cystic fibrosis.** In October, the FDA announced its approval of a three-drug combination called Trikafta as a breakthrough therapy for the genetic condition.
F. **Smoking cessation.** It's critical for people with respiratory diseases to quit smoking and avoid further compromising their breathing. However, it can be difficult for long-term smokers, who may need medications and counseling to help them quit.
G. **Supplemental oxygen.** People with advanced COPD or pulmonary fibrosis may benefit from using supplemental oxygen to deliver enough oxygen to the body and help relieve their symptoms.
H. **Pulmonary rehabilitation.** Pulmonary rehab is probably the most underutilized tool for COPD, Hogarth says. "You're going to the gym with a trainer and insurance is paying for it," he says. Officially called medically supervised exercise, it involves up to 36 covered sessions with a certified program, offered in many hospitals and outpatient settings. Pulmonary rehab works, and it's liberating, Hogarth says: "This is the difference between being able to walk around the grocery store and push the cart and then load the groceries in your car and drive home, versus struggling to breathe while getting out of the car and walking through the grocery store." You still may not be able to easily go up the stairs, but it becomes less of a struggle.

Conclusion.

Recent shift in modern medicine has been observed from treatment, towards the maintenance of health. But Unani Tibb from its advent has defined maintenance of health as one of its prime objectives. In Tibb, knowing one's individual constitutional nature and temperament is the primal step towards path of health and healing. This basic notion guides how to stay healthy and avoid diseases. It is equally beneficial for the physician for taking care of his patients and prescribing drugs accordingly. Recommendations of famous Unani physician regarding life style modification, other preventive measures along with treatment principles mentioned in the Unani authentic literature can be adopted for the prevention and management of chronic bronchitis , Asthma,COPD and Lung cancer. However, there is strong need to establish a possible correlation between the disease concept of Unani and contemporary medical science and undertake rigorous research adopting standard, reliable and validated parameters to convince the scientific community.

The role of unani herbal drugs in treating such disorder is well recognized in unani classical literature. There is strong evidence from this study that the test drugs having significant role in COPD. However, other aspect of test drugs need to be explored to provide complete and safe remedy for COPD in large sample size, maximum dose, standard controlled and multicentre study with blinding **References**

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