



ANATOMY AND PHYSIOLOGY (FACE)

The Aesthetics Academy

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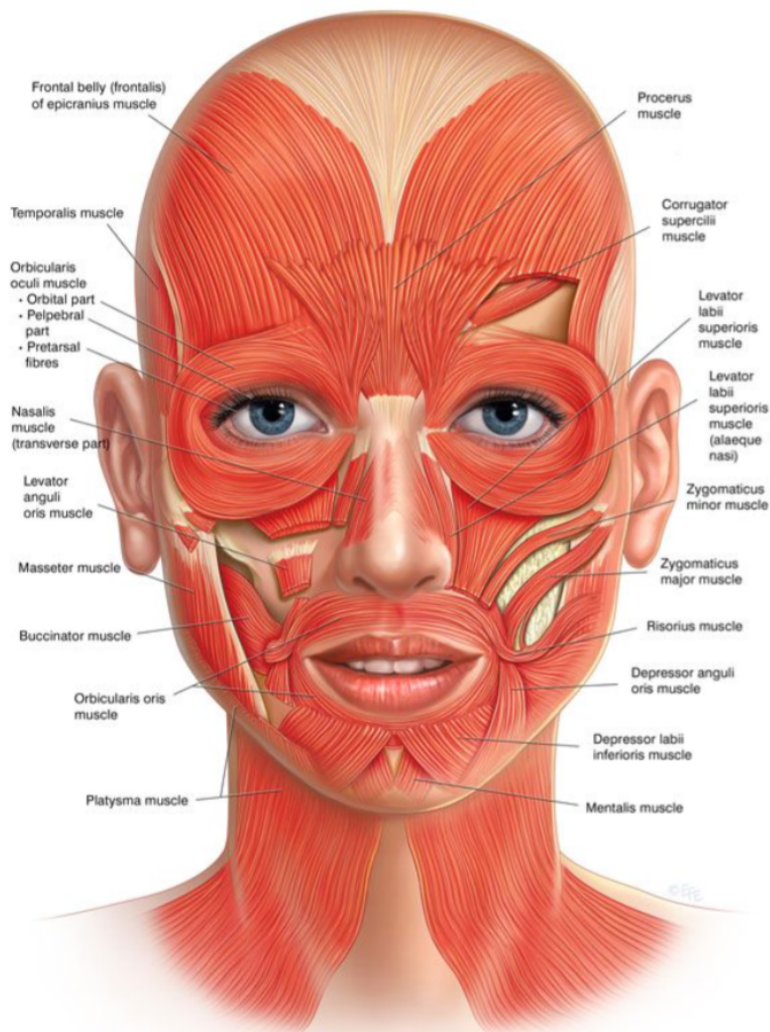
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Muscles of the Face, Neck, Shoulder, Back and Arms

The main functions of the muscles are to:

Produce	Produce movement of the body or within the body
Maintain	Maintain posture or facial contours
Cause	Cause heat production to maintain body temperature
Assist	Assist with venous return

The face has several relevant muscles.



Names, position and function of facial muscles

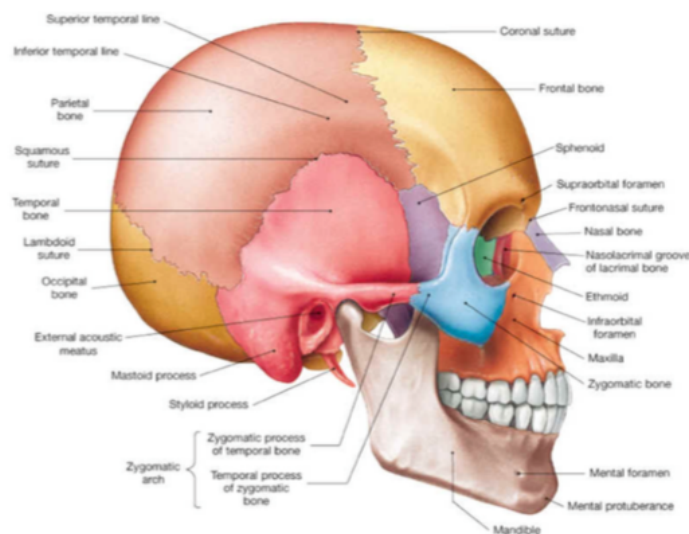
Name	Position	Action
Frontalis	Upper part of the cranium	Elevates eyebrows Draws the scalp forwards
Corrugator	Inner corner of eyebrows	Forms vertical wrinkles between the eyebrows
Procerus	Top of nose between eyebrows	Depresses the eyebrows (forms wrinkles over bridge of nose)
Orbicularis Oculi	Surrounds the eye	Closes the eye (blinking) Remember Oculi rhymes with eye
Nasalis	Over the front of nose	Compresses nose (causing wrinkles)
Temporalis	Runs down the side of face towards jaw	Aids chewing Closes mouth
Masseter	Runs down and back to the angle of the jaw	Retracts the jaw and aids chewing (remember Masseter - eater)
Buccinator	Forms most of the cheek and gives it shape	Puffs out cheeks when blowing Keeps food in mouth when chewing
Risorius	Lower cheek	Pulls back angles of the mouth (smiling)
Zygomaticus	Runs down the cheek towards the corner of the mouth	Pulls corner of the mouth upwards and sideways
Quadratus labii superioris	Runs upward from the upper lip	Lifts the upper lip Helps open the mouth
Orbicularis Oris	Surrounds the lip and forms the mouth	Closes the mouth Pushes lips forwards
Mentalis	Forms the chin	Lifts the chin Moves the lower lip outwards
Triangularis	Corner of the lower lip, extends over the chin	Pulls the corner of the chin down
Platysma	Front of throat	Draws the lower lip and jaw down, and forms horizontal wrinkles in the neck
Sternocleidomastoid (SCM)	Either side of the neck	Allows neck to flex and rotate, and nod the head

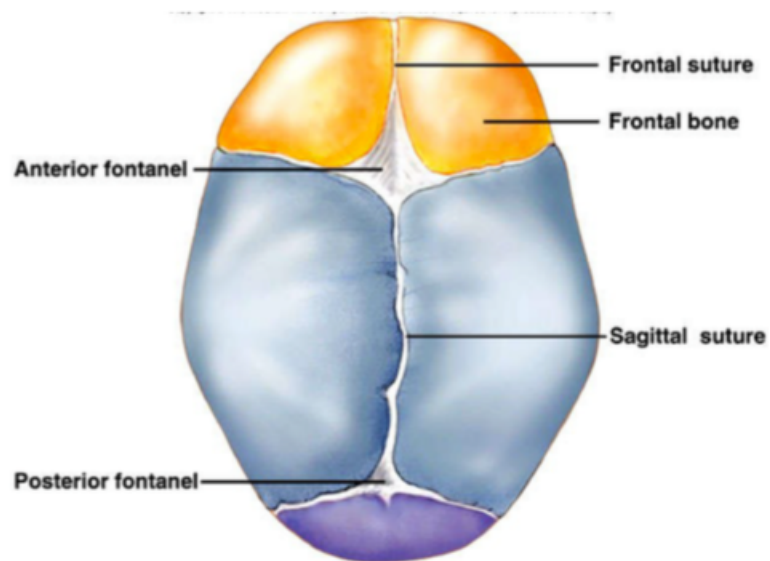
Bones of the Skull and Face

The adult skull is usually made up of 22 bones. You can find a fibrous joint in the sutures of the skull. Many of the 22 bones are small bones that make up larger ones. The most significant to you as a practitioner are:-

Name	Position
Frontal	Makes up your forehead and also the roof of your eye sockets. It joins with the parietal and temporal bones
Parietal	Forms the roof and sides of the cranium
Occipital	Situated at the back of the cranium
Temporal	Situated on both sides of the cranium
Sphenoid	Located at the front of the temples and contains a sinus cavity and houses the pituitary gland
Ethmoid	Forms the roof of the nasal passage
Nasal	Forms the bridge of the nose
Lacrimal	The most fragile bone of the face and is part of the eye socket
Maxilla	Forms the upper jaw and is the largest facial bone
Mandible	Forms the lower jaw and is the strongest of the skull
Zygomatic	Form the angle of the cheeks

Within the skull, the sinuses aim to lighten and improve the voice tone, and to secrete mucus to help with air filtration. They are to be found at the frontal, ethmoid, maxilla and sphenoid bones.





Veins and Arteries of the Head and Neck.

Blood has four main functions:

Transportation
Defense
Regulation
Clotting

Transportation:

- Red blood cells carry oxygen to the cells of the body.
- Carbon dioxide is carried back to the lungs
- Nutrients such as glucose, vitamins and minerals are transported around the body.
- Hormones are secreted into the blood and attach to the plasma so that they can be transported around the body to their target organs.
- All waste materials such as urea are carried in the blood to be removed and excreted

Clotting:

- Platelets will clot a damaged area where blood loss has occurred
- Clotting prevents excess blood loss and protects against microbe entry

Composition of Blood

Plasma (55%) a straw coloured fluid

90% water and other substances such as - blood proteins, mineral salts, food substances, waste material, gases, enzymes, hormones, and antibodies make up the remaining 10%.

Renews the cellular fluid, maintains the pH of the blood at 7.4, makes the blood viscous, provides energy to the cells, produces chemical reactions and protects against infection.

Erythrocytes (Red Blood Cells)

These are minute biconcave discs that obtain their red colour from haemoglobin combining with oxygen to form oxyhaemoglobin. These cells are made in the red bone marrow and take approximately 7 days to form. They then function for approximately 4 months until they are then destroyed by the liver or spleen.

The function of red blood cells is to carry oxygen around the body to the cells and take carbon dioxide away from the cells.

Leucocytes (White Blood Cells)

Are colourless cells, contain a nucleus, and are larger than red blood cells. There are less white cells than red, with their ratio being approximately 1 to every 600 red cells.

Their main function is to fight infection and protect the body against viruses, toxins and bacteria. There are 3 different types of white cells. Granulocytes (75%), Lymphocytes (23%), Monocytes (2%).

Thrombocytes (Platelets)

Platelets are formed in the red bone marrow and are tiny fragments that are even smaller than red blood cells.

Their role is to assist in the blood clotting process by producing a substance called thrombokinase. This sets off a chain of reactions resulting in the layering of fibres, which cover the wound, preventing blood loss,

Blood Vessels

Blood vessels are tubular in shape and their function is to form a network to transport the blood around the body, there are three types of vessels:

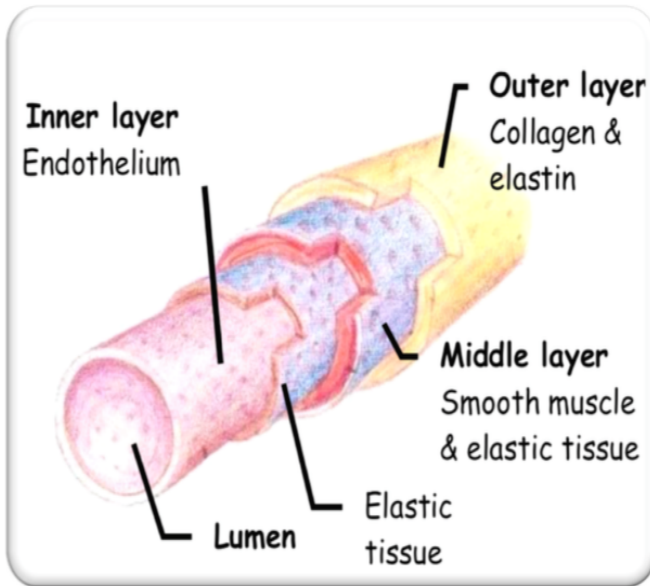
Arteries

Veins

Capillaries

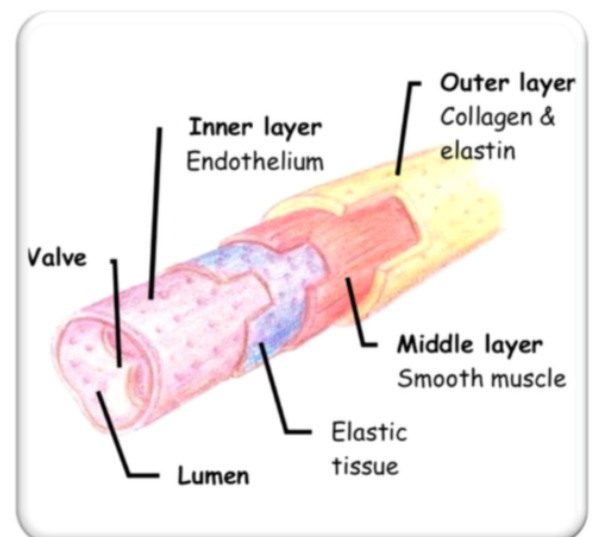
Arteries

- Carry blood away from the heart to the rest of the body
- Carry oxygenated blood except the pulmonary artery
- Blood travels at a higher pressure
- The arteries eventually form into smaller vessels called arterioles
- Contain no valves
- Tend to lie deeper in the body
- Have thicker muscular walls



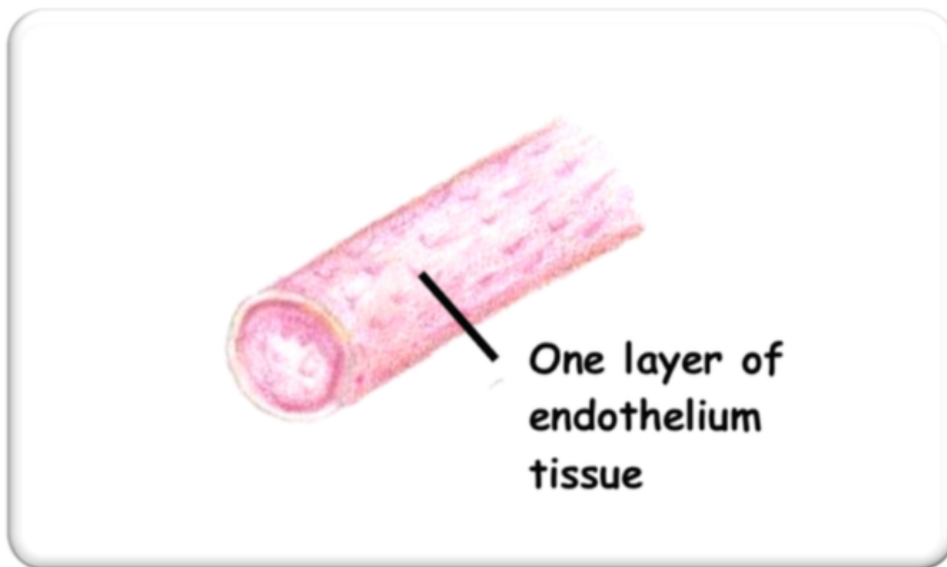
Veins

- Carry blood to the heart from the body
- Carry deoxygenated blood except the pulmonary vein
- Blood travels at a lower pressure
- The veins eventually form into smaller vessels called venules
- Veins are situated in between muscles & contain valves to prevent the blood flowing backwa
- Lie more superficially in the body
- Have thinner muscular walls

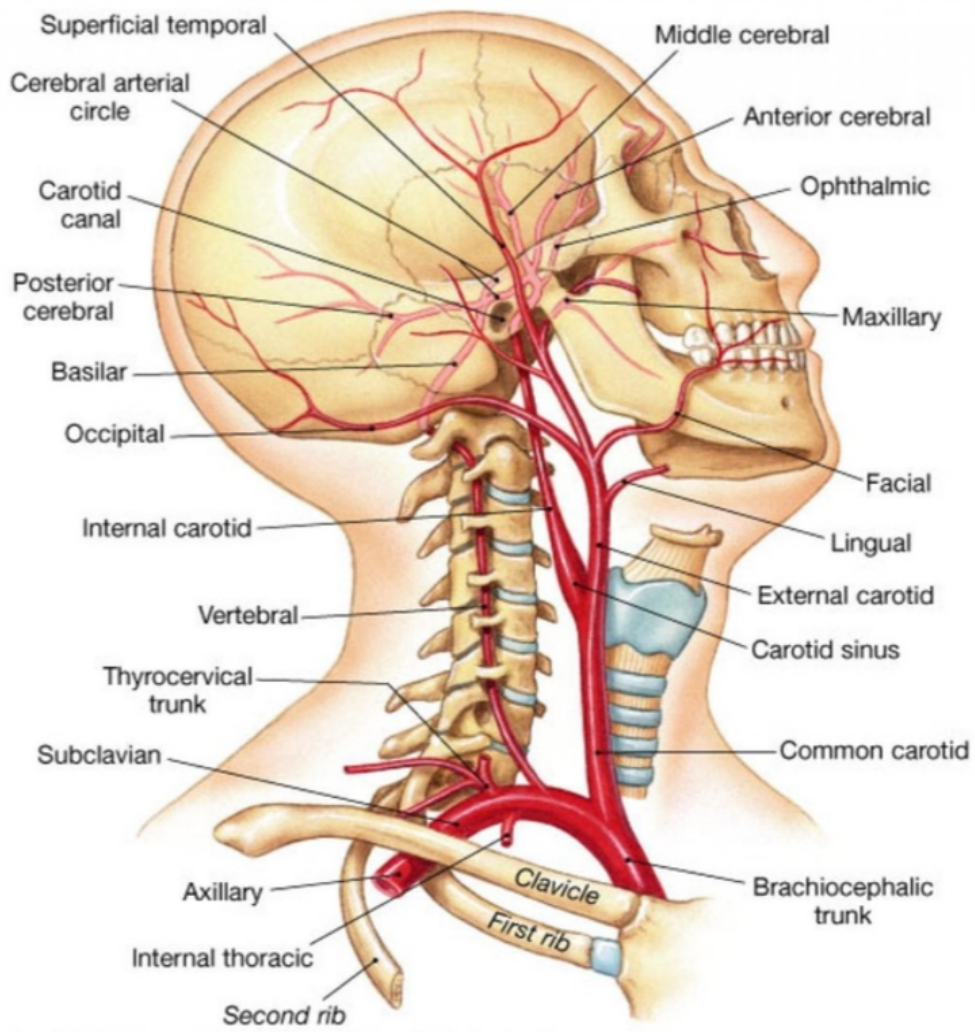


Capillaries

- Narrow blood vessels which have very thin walls, just one cell thick
- Substances can pass through
- Exchange oxygen and nutrients for carbon dioxide and wastes within all cells and tissues
- Forms the link between arterioles and venules



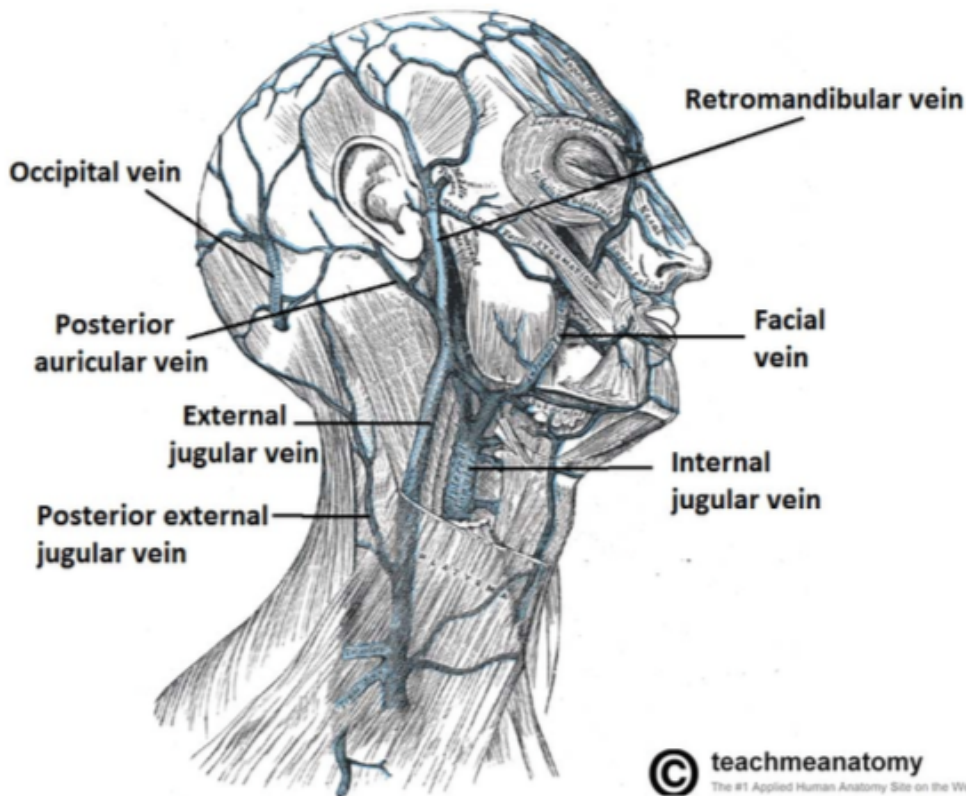
Arteries of the Head



The oxygenated blood is transported to all cells and tissues in the different areas of the body via the arteries. The aorta is the main artery that leaves the heart. This then branches off to form further arteries that are responsible for supplying certain areas of the body.

Artery	Location	Function
Common carotid artery	Each side of the neck – forms into two branches	Main blood vessel that supplies the neck
Internal carotid artery	Neck and inside the skull	Supplies blood to the brain
External carotid artery	Neck and head – has three branches	Supplies blood to the face and head
Ophthalmic Artery (OA)	First branch of the internal carotid artery.	Supplies the optic nerve, retina, some structures in the nose, face and meninges. Occlusion of the OA can produce sight-threatening conditions
Maxillary Artery	Branch of external carotid artery. Passes forward between the phenomandibular ligament and ramus of mandible	Supplies blood to many structures on the face such as mandible, maxilla, teeth, muscles of mastication
Superficial Temporal Artery	Branches from the external carotid artery near the zygomatic	Supplies the temporalis muscle and the scalp.

Veins of the Head and Neck



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The deoxygenated blood is transported from all cells and tissues in the different areas of the body in venules which eventually form veins. The deoxygenated blood returns from the body via the superior and inferior vena cava into the heart.

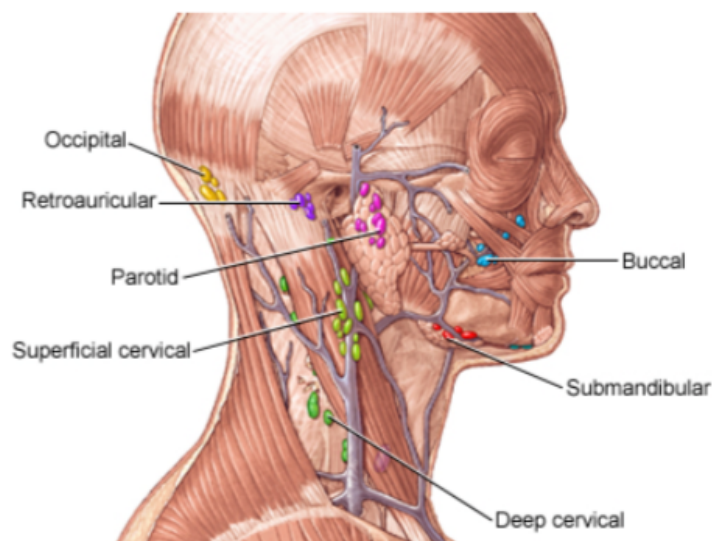
Vein	Location	Function
Jugular vein	Each side of the neck	Main blood vessel that brings blood from the head back to the body
Internal jugular vein	Neck and inside the skull	Brings blood back from the brain
External jugular vein	Neck and head – has three branches	Brings the blood back from the face and head

The Lymphatic System

The lymph system is a collection of thin tubes that carries colourless liquid called lymph. As discovered in the circulatory system, blood travels around the body and delivers oxygen and other nutrients. On its journey, fluid leaks into the bodies tissues and it is this fluid which makes the lymph, along with substances such as fibrinogen, water and lymphocytes. It travels around the tissues of the body and carries white blood cells. After travelling around the body, lymph enters one of the major lymphatic vessels, the thoracic duct, which begins near the lower part of the spine and collects lymph from the pelvis, abdomen, and lower chest. This duct runs up through the chest and empties into the blood through a large vein near the left side of the neck. The right lymphatic duct is the other major lymphatic vessel and collects lymph from the right side of the neck, chest, and arm, and empties into a large vein near the right side of the neck. This means that lymph is continuously emptied into the blood where it mixes with the plasma. The system has no heart or arteries, but capillaries that extend into most tissues, which run parallel to the blood capillaries. In conclusion, Lymph is formed when plasma seeps from the blood into the surrounding tissues and becomes tissue fluid where it is collected by the lymph vessels. The main function of the lymphatic system is to fight infection, distribute excess fluid and transport fats around the body.

Nodes

Throughout the miles of lymph vessels, there are small round nodes or glands which are bean shaped structures covered in a capsule of connective tissue. They are packed full with lymphocytes which are used to filter the lymph. These structures are made of lymphatic tissue and here the white blood cells fight infection, that is why sometimes these glands can be felt, for example in the armpits, in the groin and neck, as the lymph nodes trap bacteria or viruses that they cannot destroy immediately. The lymph node may swell and become painful and sore. Some nodes cannot be felt, for example those in the abdomen, chest and pelvis. Occasionally the lymph nodes can trap cancer cells that it cannot destroy. The nodes then become swollen but not necessarily painful. This is why it is so important to check any swollen lymph node as cancers can develop in the lymph system.



Lymph

As lymph flows through the node, lymphocytes (white blood cells) are added, which leaves the lymph cleaner due to breaking down bacteria. Lymph drains through around 8 – 10 nodes before returning to the blood. Most lymph nodes are solitary but some can be found in clusters. For example, a cluster is found in the ileum of the small intestine. These large masses of lymph nodules are known as Peyer's patches.

Lymph Vessels – carry lymph

These are microscopic, thin walled tubes which branch, interconnect and extend into almost all tissues of the body. They look like blood capillaries but they contain a larger inner space and also have a closed end. Lymph capillary walls are made up of overlapping cells that swing slightly inward when fluid outside the capillary pushes against them. This allows the milky fluid to enter the capillary, and is now referred to as lymph. Small amounts of diffuse lymphatic tissue are found in virtually every organ of the body.

Lymph capillaries join to form larger vessels called lymphatic's or sometimes called lymph veins. Lymphatic's are found in the subcutaneous tissue of the skin, following the same path as veins. Lymph vessels contain valves to prevent the back flow of lymph and they allow lymph to travel through lymphatic nodes.

Lymphatic

Lymphatic Ducts – collect lymph

Thoracic duct is the principal vessel of the lymphatic system and carries lymph as well as a substance called chyle, which is a milk fluid that contains lymph and emulsified fats. It begins in the abdomen and runs to the neck where it empties into the venous blood stream at the left subclavian vein. This duct receives the lymph from smaller vessels of the lower limbs and the upper left side of the head and neck.

Right lymphatic duct is a vessel that collects lymph from the right upper side of the body and drains it into the right subclavian vein.

Functions of the lymphatic system

The lymphatic system:

- Filters bacteria, foreign materials, toxins and any harmful materials.
- Drains away excess fluid to prevent water clogging of the tissues and cells.
- Transports proteins back into the blood supply.
- Produces lymphocytes which protect and defend the body against infection.
- Produces antibodies to fight bacteria.
- Absorbs fat from the intestine and transport it to the liver.

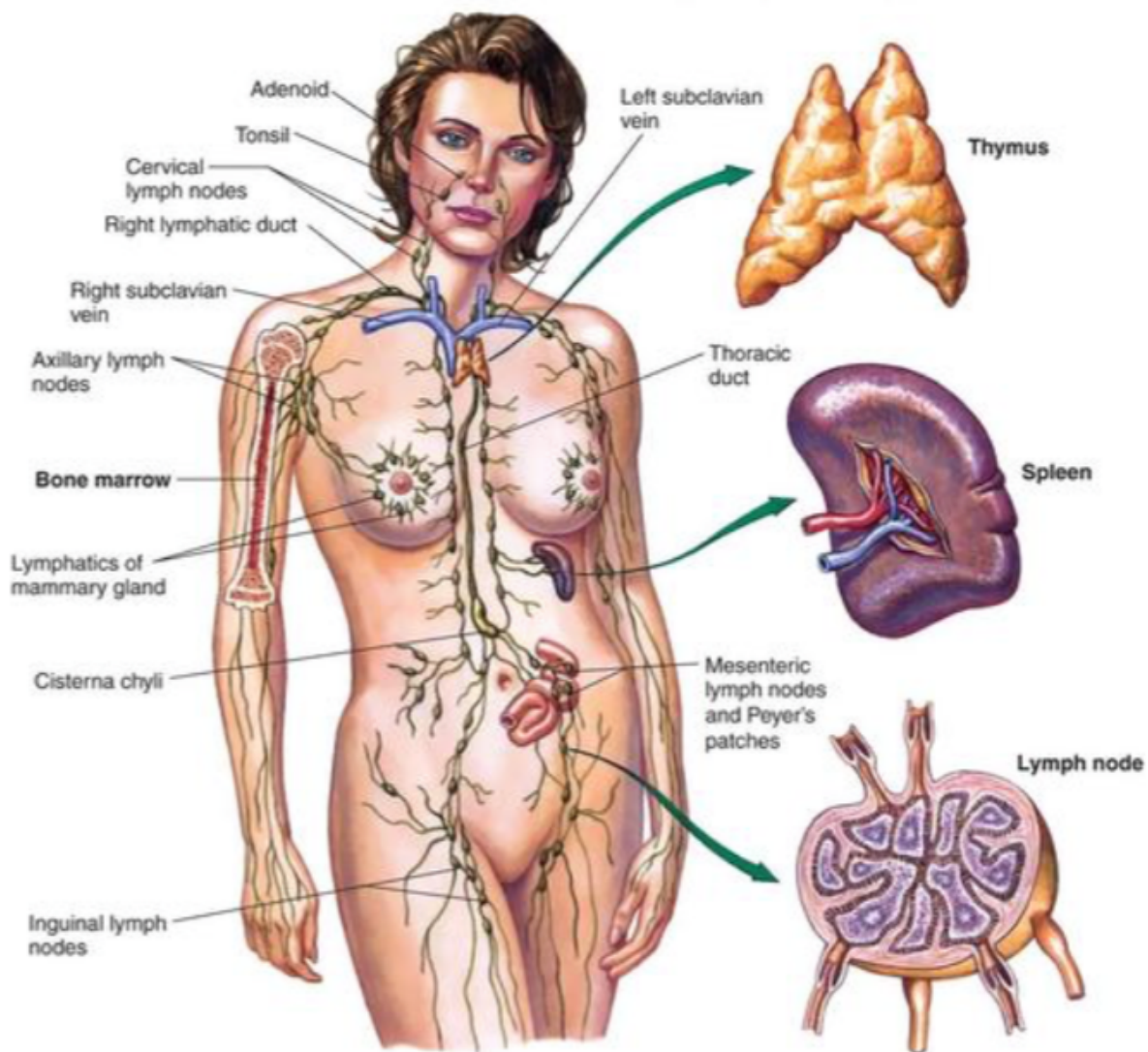
Did you know?

- When the body is ill with an infection, your glands swell up. Many of these glands are lymph nodes. When you are healthy they are about the size of a pea or grape, but during illness they can be as big as golf balls.
- Lymph nodes contain billions of white cells, multiplying rapidly to fight the invading germs. During illness they fill with millions of extra white cells and also dead germs.

Structures of the Lymphatic System

The lymphatic system is comprised of:

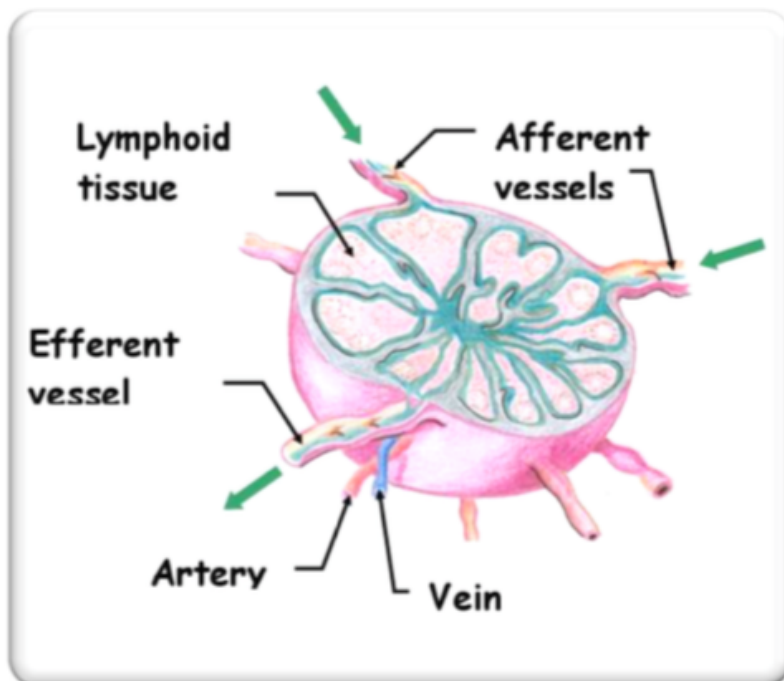
- Lymph fluid
- Lymph capillaries
- Lymph vessels
- Lymph nodes
- Lymph ducts
- Spleen



Lymph Vessels

These larger vessels run closely alongside veins and transport the lymphatic fluid through one or more sets of lymph nodes. They have collapsible walls, carry lymph at a steady pressure, and are similar to veins in structure, as they contain valves called semi lunar valves. The lymph enters the node through the afferent vessel and leaves through the efferent vessel.

Lymph Nodes

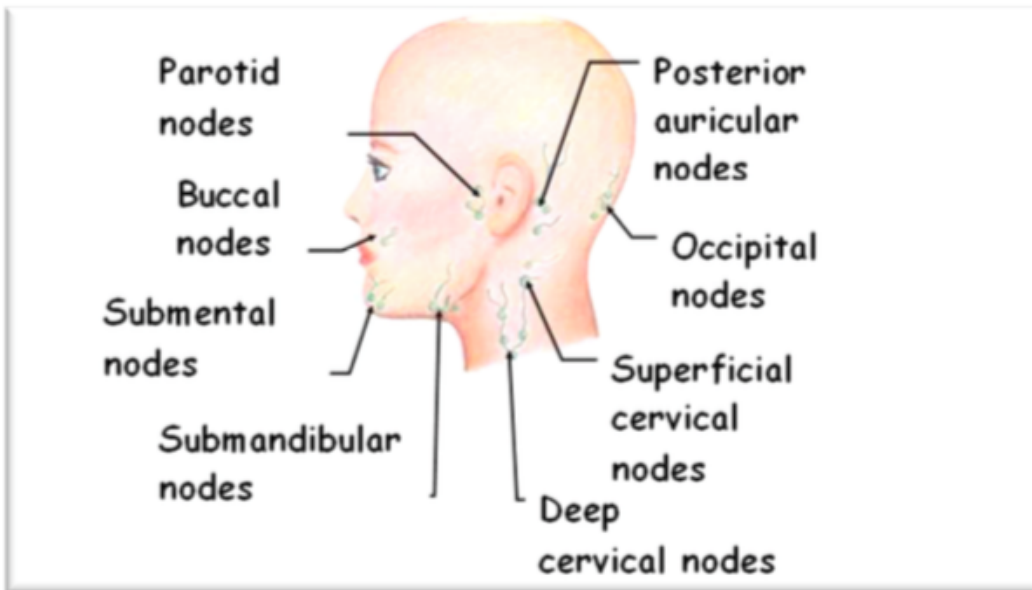


Lymph nodes are tiny clusters of glands, which filter out bacteria and toxins, therefore, protecting the body against infection. Lymphocytes, macrophages and phagocytes are numerous here; these white blood cells produce antibodies and ingest bacteria and foreign materials to fight against infection. When a person is suffering from an infection the lymph nodes swell and become tender, as the white blood cells fight the infection.

Factors Affecting lymphatic drainage

- General blood circulation - a good strong circulation ensures that the flow of tissue fluid into the lymph vessels is maintained.
- Exercise - the action of the muscles speeds up the movement of lymph through the vessels.
- Massage - enhances the drainage by forcing the movement of lymph through the vessels.

Lymph Nodes of the Head and Neck:



Node	Location	Function
Buccal nodes	Face, cheek region	Drains the eyelids, nose and the facial skin
Parotid nodes	In the face, in front of the ear	Drains the eyelids, nose and ears
Posterior auricular nodes	Behind the ear	Drains behind the ear and temple
Occipital nodes	Back of head	Drains the back of the scalp and the upper neck region
Submental nodes	Under the chin	Drains lower lip, chin and the floor of the mouth
Submandibular nodes	Under the jaw line	Drains the chin, lips, nose, cheeks and tongue
Superficial cervical nodes	In the neck, below the ear	Drains lower part of ear, parotid area and neck
Deep cervical nodes	In the neck	Drains the back of the scalp and neck