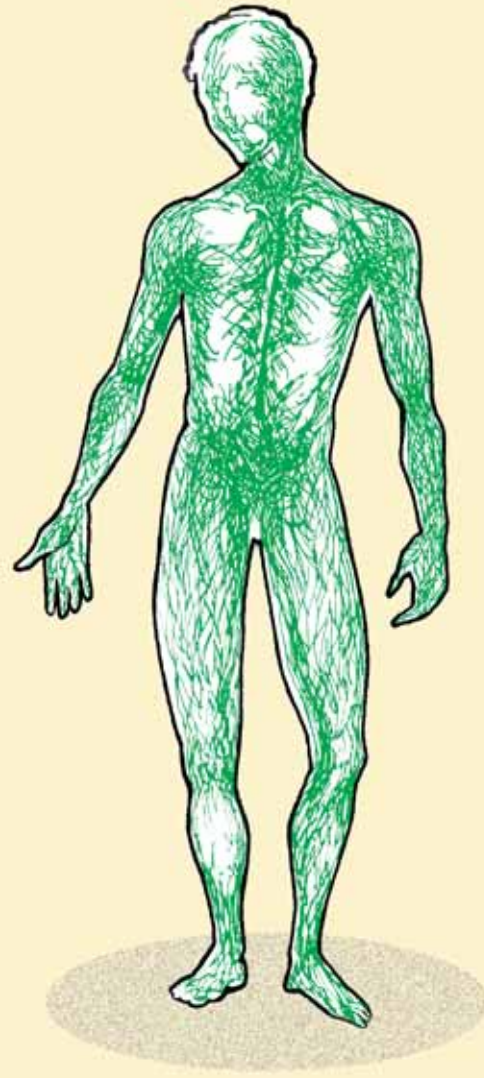


# The Lymphatic System



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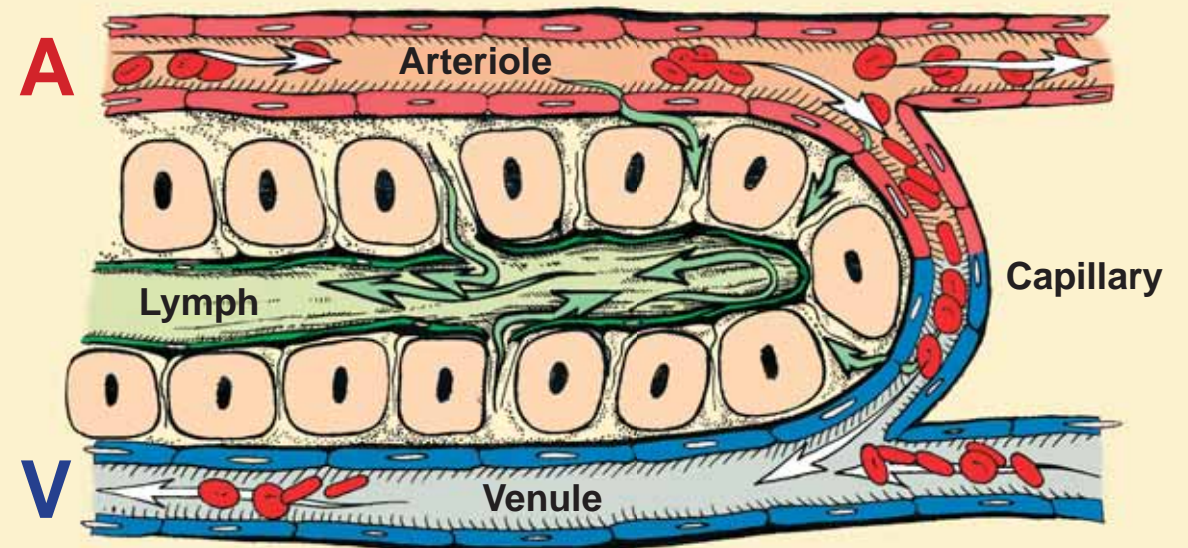
Between nearly all of the body's cells there is an interstitial fluid that bathes each cell with substances vital for its life. This is a clear colorless liquid carrying microscopic particles such as white blood cells, food, protein, and other substances necessary for the cell's health. The interstitial fluid collects in a series of closed-end tubules as lymph. This series of collecting tubes, glands along the tubes, and ducts that finally drain the lymph into the bloodstream is called the lymphatic system. Proper function of this system is critical to optimal health. Understanding the system's function will demonstrate its importance.

Nearly all tissues of the body depend on lymphatic drainage. Contained within the lymph fluid is protein that has escaped from blood vessels, including bacteria, viruses, and other particulate matter.

Protein collected in the lymph must be cleared from the interstitial spaces and returned to the blood; without this action death would occur within 24 hours.

mechanism for protein return to the bloodstream is by way of lymphatic drainage. Fortunately, the lymphatic system is quite dependable in returning adequate protein to maintain life, even when the system's overall function is sluggish.

Another very important function of the lymphatic system is trapping and disposing of foreign matter, such as bacteria and viruses. These are trapped in filters called lymph nodes located along the lymphatic vessels. The lymph nodes produce a type of white blood cell that engulfs and destroys these body invaders. The lymph nodes are concentrated in areas such as the neck, shoulder axilla, elbow, groin, behind the knee, and in the abdomen. Most people at one time or another have had swollen glands around the neck with a case of tonsillitis or some other upper respiratory infection. These are the lymph nodes actively helping to control the infection.



*Blood to nourish the body's tissue enters this schematic at **A**. As the blood passes the tissue cells, substances such as protein leak out of the blood vessel. The lymph vessel returns these substances to the bloodstream. The blood returning to the heart (**V**) cannot accomplish the task.*

If one should get a cut in the arm, bacteria may enter the wound. As bacteria collect in the lymph they are moved to the axillary lymph nodes, which trap the foreign matter and eliminate it from the body. This activity can be observed by the swollen lymph nodes in the shoulder axilla as the infection is being brought under control.

The lymphatic system also collects digestive fat from the small intestine and transports it to the bloodstream. This is also the main route by which cholesterol, the principal steroid found in tissues, makes its way into the blood. A proper amount of both fat and cholesterol is necessary for optimal health, but one must take care not to overindulge in either of these substances.

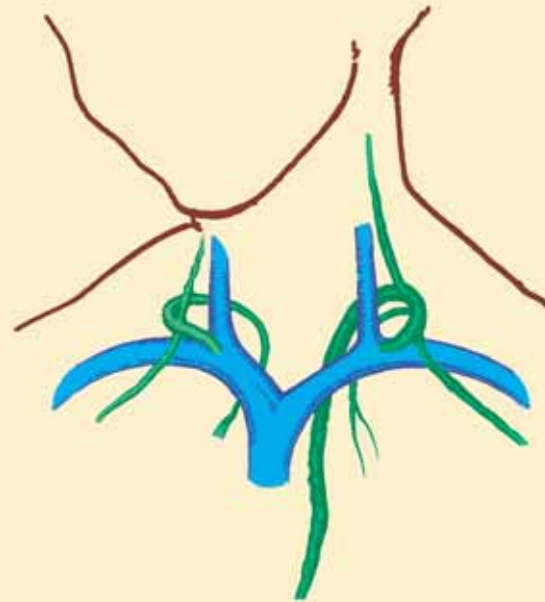
Some hormones, many of which are very large molecules, are carried to the blood by way of the lymphatic system.

The lymph system begins its collection in the periphery of the body. The lymph vessels of the lower extremity converge toward the abdominal area, meeting at a collecting point called the cisterna chyli. Here the lymph empties into the largest vessel, the thoracic duct, which ultimately drains into the venous system. This duct drains all the body except the right side of the head, neck, and thorax, and right upper limb; these areas are drained by the other main tube, the right lymphatic duct.

We see that the blood vascular and lymphatic systems have some similarities. They are both closed systems that carry fluid throughout the body; however, the methods of transporting the fluid differ considerably. The blood vascular system has a pump, the heart, that propels blood through its system. The lymphatic system has no pump. The lymph vessels have valves that permit lymph to move in only one direction. Although the larger lymphatic vessel walls have muscle fibers that contract, the major propelling factor is intermittent compression on the lymph vessel wall by surrounding tissue. When the large muscles or some other tissue puts pressure on the vessel, it squeezes the lymph along its way to drain into the venous system.

Compared to the blood vascular system the pressure moving lymph through the vessels is very low, causing the vessel to collapse easily. It is important for the surrounding tissues to squeeze the fluid along the one-way system to ultimately drain into the venous system. Frequent intermittent pressure, such as that provided by contraction of muscles during exercise and general movement, helps maintain effective lymph drainage. If, however, pressure on the vessel is constant — such as by a contracting muscle that fails to relax — the lymph vessel may stay compressed, causing sluggish drainage or stopping it altogether. If the resistance to flow develops at major vessels such as the thoracic or right lymphatic duct, large portions of the body are affected.

The most common cause of persistent pressure on the lymph vessels is muscular imbalance and postural distortion in the upper chest and neck region. This area



*The lymph vessels return the lymph to the blood. Tight muscle and fascia in this area can impede the lymph flow.*

is particularly vulnerable because the thoracic and right lymphatic ducts traverse restrictive areas and make sharp tortuous turns. Correction depends upon regaining muscle balance. Evidence of chronic strain and tension in the muscles is often observed by the tenderness they exhibit when treated.

Poor vertebral movement in the upper and mid-back regions can contribute to the condition. This may be due to muscle weakness in the back area, followed by secondary muscle contraction in the front portion of the chest. Applied kinesiology muscle testing helps identify the weak muscles as well as the contracted ones.

Imbalance of these muscles may interfere with the proper movement of one's rib cage in respiration. This action, along with diaphragm contraction, makes a major contribution to lymphatic drainage; it is especially important in the vital function of lung lymphatic drainage.

### Dehydration

Many people fail to drink enough water, thus compromising optimal lymphatic drainage. It is unknown why, but clinical evidence indicates that the body uses plain drinking water in a different way than it uses coffee, tea, fruit juices, or some other commercial-type drink. The body seems to process these items as stimulants or food. The proper amount of water varies considerably with types of activity and environmental conditions. Obviously, when it is hot and one perspires heavily, more water is needed.

### Neurologic control and treatment of lymph drainage

It is well-known that there are neurologically controlled muscle fibers in the large lymph vessels. Contraction of the vessels helps propel lymph drainage into the venous system. As yet research has not documented the total extent of the nervous system's role in lymphatic drainage.

Neurologic reflex points thought to affect lymphatic drainage were developed by an osteopath, Frank Chapman, in the 1930s. The method has been used with clinical success, and its use has been broadened in applied kinesiology as the neurolymphatic reflexes. Stimulation of these reflexes,

muscles that previously tested weak. Clinical evidence indicates a localized improvement of lymphatic drainage that might affect the associated muscle, organ, or gland.

### Conditions caused by sluggish lymphatic drainage

There are numerous conditions that clue the doctor to examine for poor lymphatic drainage. In-infection of any type is a primary indication. Among these are upper respiratory infections, such as sinus-itis, ear (eustachian tube) infections, nose and throat problems, common colds and tonsillitis, and lower respiratory infections such as bronchitis or pneumonia. Structural problems are also frequently involved with poor lymphatic drainage, such as tennis elbow, repeated strained or sprained ankles, and low back-ache. Patients often have a feeling of being run down or have poor circulation, indicated by cold hands or feet or numbness and/or tingling in the extremities. Even frequency of nighttime urination or grinding of the teeth during sleep can be associated with poor lymphatic drainage.

Swelling in the ankles, feet, and hands definitely gives indication to evaluate the lymphatic system. This is particularly important since excessive fluid concentration is not clinically observable until the level is 30% above normal; consequently, there may be no outward evidence of poor lymphatic drainage, even though the applied kinesiology examination indicates that improvement is necessary.

Any of these symptoms or signs indicate that a thorough evaluation of lymphatic drainage should be made. It may be necessary for your doctor to locate and stimulate neurolymphatic reflex points to improve local areas. There may be postural distortion or muscular imbalance blocking major lymph vessels. In addition to correcting these neurologic and structural factors, it may be necessary to take certain nutritional supplements to help correct poor drainage. You can help optimize lymphatic drainage by maintaining a good level of physical activity and drinking sufficient water to maintain proper hydration.