

Sports massage benefits to the lymphatic system



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Sports Massage Benefits to the Lymphatic system The Structure and

Function of the Lymphatic System The lymphatic system originates from blood plasma and is a constant circulation. It consists of complex capillary networks which collect the lymph in various organs. There is an elaborate system of collecting vessels which travel the lymph from the capillaries through lymphatic vessels, lymph nodes, larger lymphatic vessels to lymph trunks and finally to the large veins of the neck at the junction of the right and left internal jugular and subclavian veins where the lymph drains into the blood stream. Lymph glands or nodes are interspaced in the pathways of the collecting vessels and filter the lymph and remove toxic substances as it passes through them and contribute lymphocytes to the lymph. The lymphatic system forms a one way flow system towards the heart. The lymph flows through the system coming from blind ended lymphatic capillaries at the endothelium single layer. This single layer has an incomplete basement membrane and there is a gap of 14 microns which makes it very permeable to large particles, plasma proteins and carbon particles. The capillaries have a loose overlap of small anchoring filaments which contain elastic fibres. When the external pressure is greater with excess interstitial fluid the anchoring filaments are pulled making the openings between cells even larger so fluid can flow to the lymphatic capillary and help the lymphatic vessel take large particles such as viruses, pathogens and cell debris. When the internal pressure is greater in the capillary the cells adhere more closely together and lymph cannot escape back into the interstitial fluid. The pressure reduces when lymph moves further down the lymphatic capillary. The capillaries are tiny tubes that have small one way valves which ensure the lymph flow is only in one direction

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away from the tissues. Each capillary is 10-50 microns in diameter, slightly larger than blood capillaries. After the tissue fluid enters the lymph capillaries it is called lymph. The lymph fluid is further moved through the system by compressions caused by general skeletal muscle movement, breathing and the pulmonary system. The capillaries lead into connecting vessels which then flow into lymph nodes and then trunks. In the small intestine there are special lymphatic capillaries called lacteals that pick up fats and fat soluble vitamins and carry them to the lymphatic vessels and then into the blood. The lymph in the lacteals has a milky appearance due to its high fat content and is known as 'chyle'. Most of the fluid, about 90%, filters freely through the capillary walls to form interstitial fluid and is returned but the other 10% becomes part of the interstitial fluid that surrounds the tissue cells. *If there is excess interstitial fluid and proteins the lymph capillaries pick them up and return them to the venous blood. Although small protein molecules may leak through the capillary wall and increase the osmotic pressure of the interstitial fluid. This further inhibits the return of the fluid into the capillaries and the fluid tends to accumulate in the tissue spaces. If this continues even over a brief period of time blood pressure and volume decreases significantly and the volume of interstitial tissue fluid increases causing swelling known as 'edema'. (Without the recirculation the blood volume and pressure would drop significantly causing tissue destruction or death because the cardiovascular system would stop in time and massive swelling would take place). The lymphatic vessels therefore help avoid edema and they act as drains to collect the excess fluid and return it to the venous blood. The lymphatic vessels lie in the subcutaneous tissue and run parallel to the veins. Their structure is very

similar to the structure of veins except lymphatic vessels have more valves, thinner walls and contain lymph nodes at certain levels. Lymphatic vessels cause anions to bond to help the flow of the lymph toward the thoracic region. Both the lymphatic capillaries and collecting vessels are lined throughout by a continuous layer of endothelial cells which therefore form a closed system. Lymphatic vessels pass into lymph nodes which are bean shaped organs consisting of B cells and T cells. As the lymphatic vessels pass from the nodes they then unite to form lymph trunks in certain regions of the body. The main lymph trunks are the lumbar, intestinal, bronchomediastinal, subclavian and jugular trunks. The lumbar trunks drain lymph from the lower limbs, the wall and viscera of the pelvis, the kidneys, the adrenal glands and the abdominal wall. The intestinal trunk drains lymph from the stomach, intestines, pancreas, spleen and part of the liver. The bronchomediastinal trunks drain lymph from the thoracic wall, lung and heart. The subclavian trunks drain the upper limbs. The jugular trunks drain the head and neck. From the lymph trunks, the lymph passes into two main channels, the right lymphatic duct and the thoracic duct. The right lymphatic duct receives lymph from the upper right side of the body and the thoracic duct receives lymph from the left side of the head, neck and chest, the left upper limb and the entire body inferior to the ribs. From these two ducts the lymph then passes into the venous blood at the junction of the right internal jugular and right subclavian veins and left internal jugular and left subclavian veins. Lymph is a clear, pale yellow watery fluid that is found in the lymphatic vessels. (Except lymph draining from the small intestine mentioned above). It contains antibodies and immune cells and makes up 3% of the body's weight. The lymphatic system, as suggested at the beginning consists of a <https://assignbuster.com/sports-massage-benefits-to-the-lymphatic-system/>

spleen, bone marrow, appendix, tonsils, lymph nodes and a thymus gland among other organs. The thymus reduces in size as we age. It has an outer cortex which has many T cells and some dendritic cells, epithelial cells and macrophages. Immature T cells from red bone marrow move to the cortex and when surrounded by epithelial cells and thymus hormones they mature. 2% of the T cells then move to the medulla then leave the thymus via the blood to the lymph nodes, the spleen and other organs. The spleen is one of the largest and most important organs of the lymphatic system. It consists of two tissues called white pulp, consisting mostly of lymphocytes and macrophages and red pulp where veins are closely associated. The functions of the lymphatic system are: - Maintains fluid balance * see above - Absorbs fats and fat soluble vitamins from the small intestine and transports these substances to the venous circulation - Immunity. The lymph nodes and other lymphatic organs filter the lymph to remove invading micro organisms and other foreign particles. Bibliography: www.medicalengineer.co.uk www.tqnyc.org/NYC040719/lymphatic_system.htm www.cayuga-cc.edu/people/facultypages/greer/biol/204/lymphatic.html Principles of Anatomy and Physiology by Gerard J. Tortora and Bryan Derrickson Anatomy and Physiology by James Bevan