Functional Fascia

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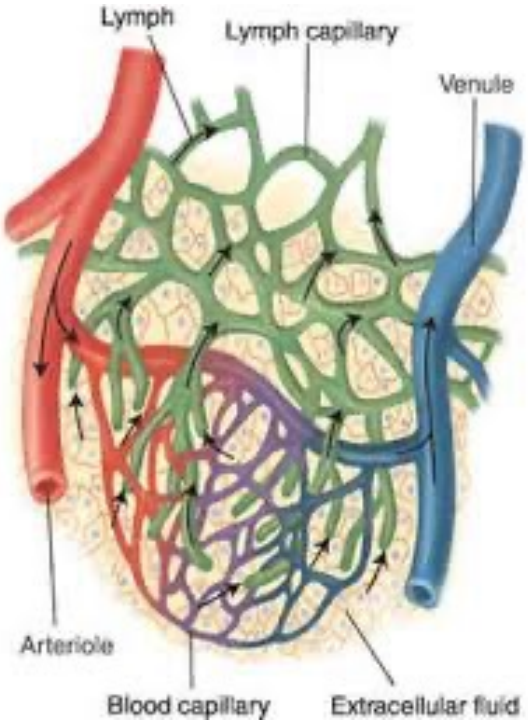
THE LYMPHATIC SYSTEM

The lymphatic system consists of lymphatic fluid, lymphatic vessels, lymphatic tissue, and lymphatic organs located throughout the tissues of the body. It functions to **drain excess interstitial fluid** from the tissues, to **initiate an immune response** against disease by producing and transporting lymphocytes, and to **transport dietary lipids** absorbed by the gastrointestinal tract into the blood.

VESSELS AND CIRCULATION

Lymphatic vessels originate as tiny, hair-like capillaries in the **interstitial spaces** between cells. These capillaries join together to form larger lymphatic vessels that are similar in structure to veins. These vessels accompany veins and arteries and are often located superficially. Dotted along these vessels are around 600 **lymph nodes** which are small, bean-shaped glands that contain **lymphocytes** and **macrophages**.

LYMPHATIC CAPILLARIES



Lymphatic capillaries extend throughout the tissues of the body among blood capillary beds. Interstitial fluid, similar in composition to blood plasma, leaches from the blood capillaries into the surrounding tissue, bathing the cells and supplying each one with nutrients, oxygen, and water while also removing waste, carbon dioxide, and water. Around 30 liters of fluid leave the capillaries every day, but only 27 liters return to the venous capillaries.
Few large proteins leave the blood capillaries as they are too large to pass through the capillary walls. Those which do leave cannot return to the blood capillaries by diffusion as the concentration gradients are too high so instead, they move into the lymph capillaries and are transported back to the venous circulation.

Lymphatic vessels function to drain this excess fluid from the tissues as **lymph** and return it into the blood circulation. The capillaries have a unique structure which allows fluid to flow into the lymphatic capillaries and into the larger lymphatic veins, but not out.

LYMPHATIC DRAINAGE

Lymphatic vessels unite to form **lymphatic trunks** which accompany blood vessels and eventually unite to form two main ducts: the **thoracic duct** and **right lymphatic duct**, which drain the lymph into the left and right **subclavian veins**, respectively.

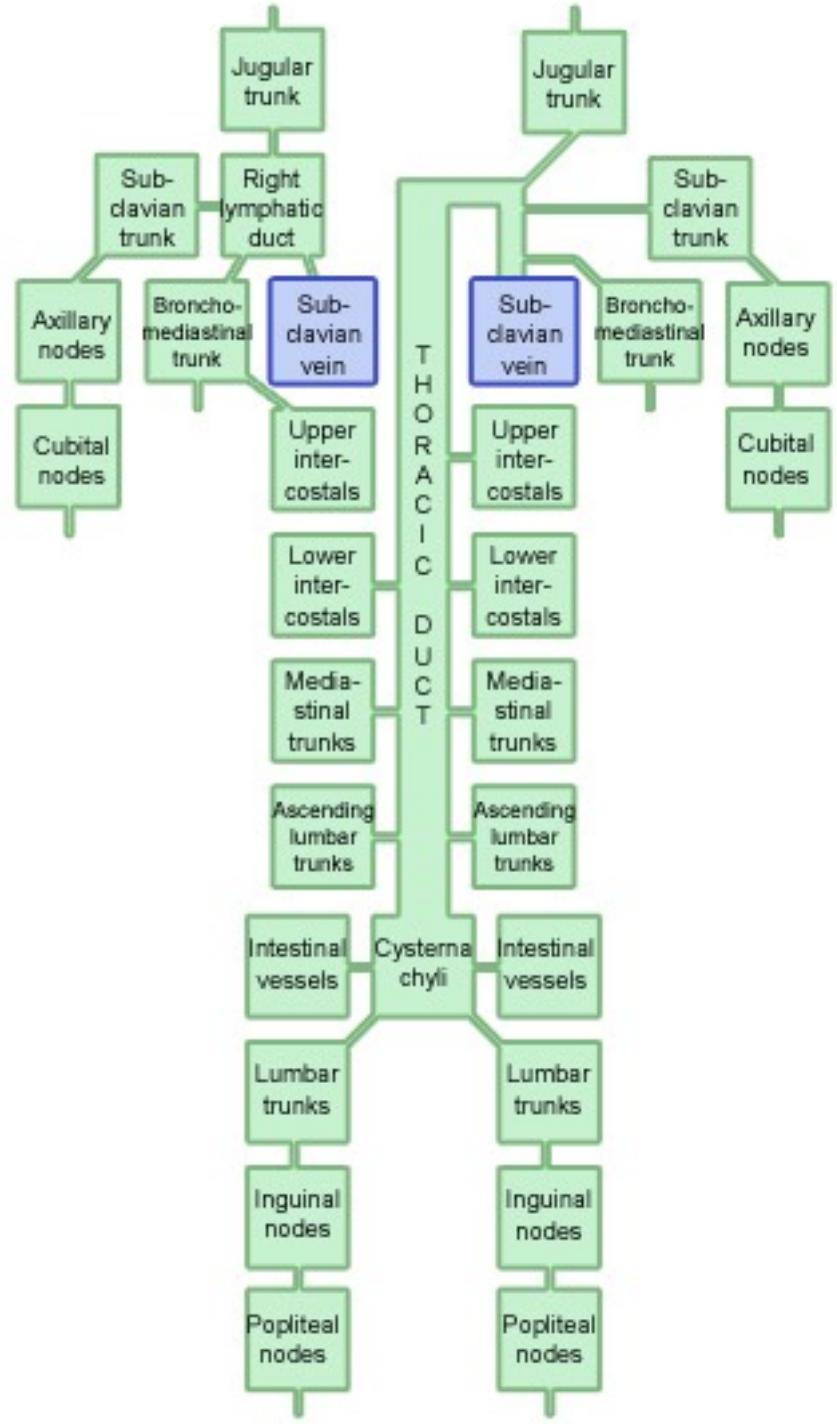
Thoracic duct

The thoracic duct is about 38-45 cm long and forms the largest confluence of lymphatic vessels in the body. It receives lymph from the left side of the body as well as the lower right side.

It originates at the **cisterna chyli**, which is a small pouch that lies on the surface of L2. From here, the thoracic duct ascends the thorax to the left of the vertebral column. It then joins with vessels from the neck and empties into the left subclavian vein at its junction with the left internal jugular vein.

Right lymphatic duct	
	The right lymphatic duct is much shorter than the thoracic duct and may only be 1 cm long. It is formed by the confluence of the right **bronchomediastinal**, **subclavian**, and **jugular** ducts, which drain the right side of the head and thorax and the right arm, respectively. It drains into the junction of the right subclavian and right internal jugular veins.

LYMPHATIC VESSELS



Function of the upper body in respiration

The position of the shoulders, head and neck are therefore critical to effective respiration in two aspects.

Firstly the movement of the upper body and limbs drives lymph both directly via muscular contraction and increased respiration and secondly we know that lack of movement creates lack of ability to move and an increase in stiffness and tension.

In turn this makes the accessory muscles of respiration less available at times when they will be needed ie movement but also in times of fighting off viruses. This will have a two fold effect. The lack of ability to move will decrease the movement of lymph and decrease efficiency of cleaning and immune system function.

Therefore the effect of any infection such as a virus is two fold. Firstly our immune system which is dependent on the circulation of clean lymph is unable to cope with the increase in requirement and secondly the demand on our accessory muscles to step up in the face of depleted resources is compromised. Infection takes hold and has a better chance of winning where the fight is easy.

Obesity, poor air quality, poor nutrition, lack of physical fitness and existing conditions, especially those that might involved the respiratory or cardio vascular system are all situations where we have seen an increase risk of serious illness and death.

Age is a factor, but fitness is more of a factor. Age per se isn't necessarily the issue but health is.

Prevention starts now.

The best time to plant a tree? 20 years ago. The second best time to plant a tree? Today.

The same goes for smoking, getting fitter, eating better, losing weight.

Thoracic vs Abdominal

The separation of these cavities are nominal and functional in terms of physiology, but not in terms of structure, movement, breath and so forth.

We think of the two as being very separate, but the actual separation is by nothing more than a thin screen between them. Although critical in terms of fluids, pressure, blood supply and so forth, there is a reason that the screen is so thin.

This is because the two sections need to communicate and function together. Anything that influences one side of the screen is going to influence the other, particularly when it comes to movement.

The mental separation of these two areas in anatomy is probably one of the most harmful of all the many separations that exist. By separating their functions, we can attach words, surgery, breathing techniques, manual therapy approaches, and all kinds of other ideas and direct them to the space we choose.

Visceral manipulation, abdominal breathing vs diaphragmatic breathing and so forth. The effects of one on the other is inescapable and immense and whilst clinically directed reasoning towards diagnosis is of course needed, the dependence of these two areas on each other should not be underestimated or undervalued.

Transportation of lipids explained here.
http://www.vivo.colostate.edu/hbooks/pathphys/digestion/smallgut/absorb_lipids.html