

Do Not Forget Your Lymphatics: Pathways to Fluid Transport, Detoxification and Immune Surveillance

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Much has been discovered about the lymphatics system since it was originally discovered in 1622 ¹; from its description by Emanuel Swedenborg (1688-1772), who stated that the “spirituous fluid” present within the cerebrospinal fluid travels throughout the entire body and is returned to the blood by the lymph vessels ², to the modern rediscovery of the lymphatics in the CNS ³, and the recent description of the lymphatic system ⁴.

You already know that some of the essential functions of the lymphatic system are to maintain tissue fluid balance; facilitate immune cell trafficking from the periphery to the lymph nodes, as well as absorb lipoproteins and fat. One of the goals of this article is to emphasize how easily our hands can greatly support or enhance these natural functions. We can never overlook the power of our hands.

We know that the lymphatic system recovers most of the fluid that escapes from the blood circulation. At some point though, scientists thought that 90% to 98% of this fluid was recovered by the veins (blood reabsorption) and only 2% to 10% by the lymphatics. The situation is now inverted, and venous circulation may have an extremely limited role in reabsorption ⁵. In other words, most of the fluid that is leaked from the blood circulation into the tissue is regained by the lymphatics. This extracellular fluid is extraordinarily important for physiologists and bodyworkers.

The tiny initial lymphatic vessels (or lymphatic capillaries) are made of a single layer of endothelial cells with junctions that constitute a primary lymphatic valve system. These “oak-leaf” shaped cells can open their “button-shaped” junctions about 2–3 μm . They are highly permeable and easily let interstitial fluid and its components enter the lymphatic system ⁶. The initial lymphatic system has another important specificity not found in blood vessels: they have little fibers, called anchoring filaments, attached outside the lymphatic cells, which are connected to the surrounding tissue ⁷. Some of these fibers attach all the way to the superficial dermis (skin), and we will see their importance in transmitting forces from the hands of the manual therapist.

Once inside a lymph capillary, the extracellular fluid is now called lymph, and its composition is slightly different (it has, for example, a different concentration of water and ions). Many components can enter the lymphatic system; these include water, macromolecules, ions, hormones, lipids/chylomicra, immune cells, debris, and cancer cells, as well as infectious pathogens, such as bacteria and virus particles ⁸.

Lymph capillaries transform into pre-collectors and then into larger collector vessels. Secondary valves (a little bit like the venous valves) appear inside the lymph collectors, spaced at intervals of a few millimeters to a few centimeters. These valves typically prevent back flow and guide the lymph unidirectionally.

Recently, the description of the lymph propulsion system has been revised. It must be remembered that the lymphatic collectors contain intrinsic muscular units called “lymphangions” ¹¹ that actively propel lymph flow. The lymphatic system should never be described as a passive system, as many schools used to describe it, even as recently as a few years ago. These active muscular movements help transport fluid from the tiny interstitial spaces to the lymph nodes ¹², and eventually empty this content into the large veins at the base of the neck (the “angulus venosus”).

Without getting into too much details, the lymphatic muscles are composed of components with both smooth and striated muscles, and it has been irrefutably established that lymphatic muscles in the lymphangions are a new class of muscle type, separate from both smooth muscle and cardiac muscle ¹³!

Lymph flow is determined by a combination of the active, inherent contraction/relaxation of the lymphangions, and passive, external compressive forces. Internal forces alone are usually not enough to effect lymph circulation, it needs the help of external compressions such as contractions of skeletal or smooth (intestinal) muscles, respiration, or pulsations of surrounding arteries; this can also include the specific strokes of a trained manual therapist ¹⁴.

Lymphatic pumping is very sensitive to stimulation of the lymphangions’ wall stretch receptors: the changes in external pressure produced by your manual strokes can, for example, efficiently stimulate contraction of the lymph vessels’ muscular units ¹⁵.

A few lymphatic rhythms can be perceived manually by a trained operator. One of them is related to the lymphatic pump cycle: the opening of the primary valves in the initial lymphatics to let fluid enter the initial lymphatic vessels, the contraction of the lymphangions, and the opening and closing of the secondary valves inside the collectors.

It takes time and application to be able to feel such subtle rhythms. As a general understanding, lymph collectors are usually 100 to 600 microns in diameter. The movement created by lymphatic contractility can be transmitted to the surrounding tissue and the skin through the external anchoring filaments, which are attached to the skin.

Human hands need to be able to feel a change of at least a few microns to be able to follow the specific lymphatic rhythm. Numerous studies have shown that the mean detection threshold of human mechanoreceptors is within a few microns ^{9,10}.

The lymphatic system is also a unique conduit, serving as a trafficking route for immune cells, regulating inflammation-related pathologies such as atherosclerosis, hypercholesterolemia [16](#), inflammatory bowel disease [17](#), metabolic syndrome [18](#), or obesity. Because of the critical role of the lymphatic system in inflammation and immune functions, a dysfunctional lymphatic transport, or sluggishness of the system, can harm numerous bodily functions.

In the body, antigens (toxins or foreign substances that can induce immune defenses) and antigen-presenting cells (e.g. macrophages, dendritic cells, some type of lymphocytes) are responsible for initiating the immune response.

The lymphatic system greatly helps initiate the immune response by delivering antigens to patrolling immune cells. When the body is infected by microorganisms (e.g. bacteria, virus, fungus, etc.), these antigens are transported to the lymph nodes by the lymphatic vessels. Usually, antigens and antigen presenting cells, such as the numerous dendritic cells, need to reach the depth of the lymph node to activate B cells (that can produce antibodies), or especially T cells (e.g. cytotoxic T or killer T cells), to handle the antigens and create long term memory against it [19](#). Dendritic cells are known to be the most potent antigen presenting cells.

Your hands can stimulate the natural encounter between antigen and patrolling immune cells, help immune function and increase tissue awareness by:

- Increasing the entry of antigen/antigen-presenting cells, such as Dendritic cells (DCs), into the lymphatic vessels
- Increasing the antigen/DCs circulation through the lymphatic vessels and nodes
- Stimulating the antigen and antigen-presenting cells trafficking in the lymph nodes

These processes lead to the production of immune cells and antibodies, and a reduction in pro-inflammatory chemokines (substances that can attract white blood cells to infectious areas).

For example, the lymphatic vessel endothelium secretes the chemokine receptor D6, which will bind with and vitally decrease inflammatory response [20](#).

Clinical Applications: Lymph Drainage Therapy (LDT)

I hope you are now getting a better understanding of the importance of the lymph system in initiating proper immunity, to help produce antibodies, cytotoxic immune cells, and memory cells (lymphocytes), against toxins or invading foreign substances. Activation of lymph flow through the lymphatic nodes can also stimulate the immune system and increase production of lymphocytes by about 30 percent.

So, do not forget your lymphatics, and remember to keep your own lymphatics healthy with self-manual lymph drainage therapy.

There are a few methods of lymph drainage therapy. The idea is to stay as close as possible to the natural rhythm of the lymph capillaries and collectors to attune to the intrinsic rhythms of these structures without forcing them, and especially without harming them. Very gentle and specific rhythmic pressures are usually necessary to enhance natural lymphangion motoricity.

We have found that the best results are usually realized when the practitioner attunes to his specific lymph flow rhythm, depth, direction, and quality.

1) Human lymphatic rhythms:

Most often, lymph doesn't need to be pushed with our fingers like a tube of toothpaste; the trained practitioner's hands just need to be applied in synchrony with the lymphatic system to re-stimulate natural lymphangion contractions.

2) Attune to the direction of the lymph flow:

This is a good skill that can be acquired over the years. Advanced LDT practitioners can assess and manually "map" the flow of the lymphatic circulation during sessions. This method consists of manually assessing the specific direction of lymphatic flow and finding areas of fluid retention, edemas, or fibrosis. The mapping tools are very important in cases of fluid obstruction because they can be used to find the most accurate alternate lymphatic pathways to evacuate stagnant fluids. This cannot be done with our minds, we must be able to listen and follow the flow. By honoring and connecting to the body's innate intelligence, it is able to self-correct and reinstate its natural inherent flow patterns.

3) Depth and pressure:

The ideal pressure in non-pathological tissues has been calculated as no more than 33 mm of mercury per cm² ²¹. This standard pressure used is very light. We need to identify the specific depth of the lymph circulation we are addressing because we will use a different pressure when working on superficial lymph circulation, or on the lymph circulation of muscles, viscera, periosteum, or even dura matter.

4) Quality:

Lymph can be quite viscous in cases of chronic lymph retention like allergies, fibromyalgia, chronic fatigue syndrome, chronic inflammation, etc. The quality of the lymph needs to be monitored during treatments.

Clinically, these lymphatic techniques are usually not very difficult to learn, and often give new skills to practitioners that are not used to feeling the bodily fluid under their hands. If they are used to obtaining results only with deep work on the myofascia, it is

time to switch to a new paradigm: “no pain can result in a lot of gain!” So why not be non-invasive, respectful, loving to the tissue, as well as wonderfully efficient?

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