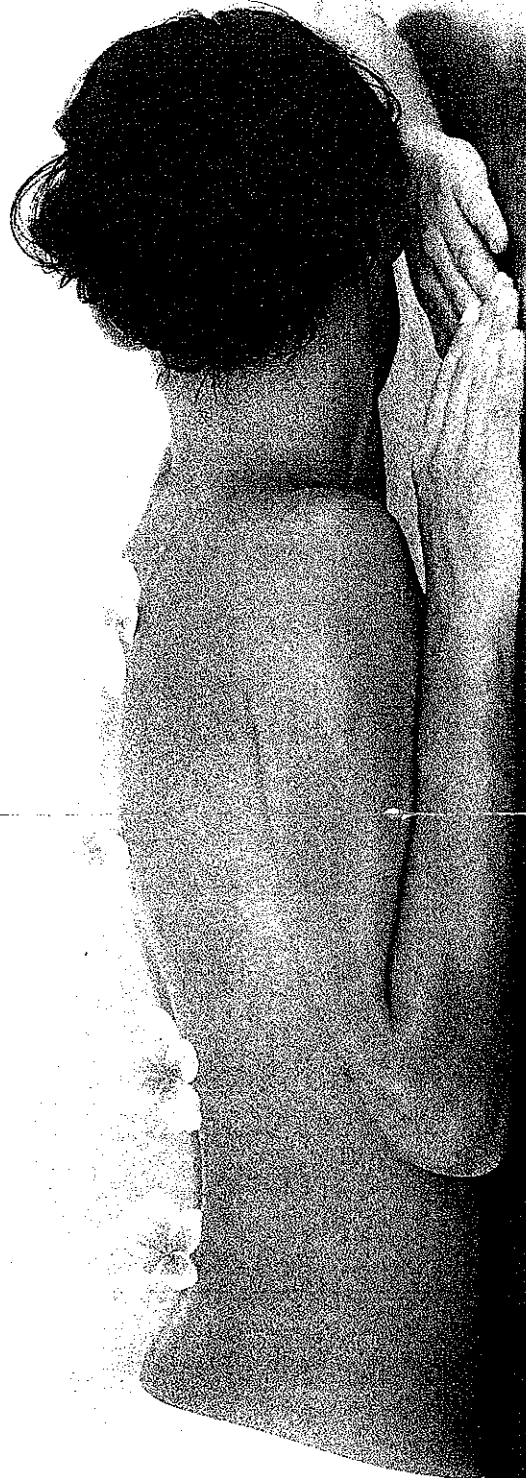


*A Blueprint Of
Manual Lymphatic Mapping*

#2005.01



By Bruno Chalky

THIS GENTLE, NONINVASIVE METHOD WILL ADD NEW DIMENSIONS TO YOUR PRACTICE

Discussions with therapists on the subject of the lymphatic system, comments invariably ensue on how little is known about this component of the human body. Many therapists consider it a mysterious system, difficult to palpate or assess on clients.

Within the scientific and medical communities as a whole, there is still a significant lack of education about the "fluid body" and, more specifically, the lymphatic system. That is changing, though. Lymphology is a new theoretical and clinical branch of science that is gaining recognition. Practical applications based on recent discoveries in this field are making their way into the hands of manual therapists.

One such technique is manual lymphatic mapping (MLM). Among the latest advances in lymph drainage therapy (LDT), this gentle, noninvasive method can greatly enhance aspects of a massage therapy practice.¹

Manual lymphatic mapping enables practitioners to determine the specific direction of lymphatic circulation in the whole body before, during and after a session. Armed with this information, therapists can assess the exact locations of lymphatic problems and monitor any improvements as they occur during the session.

The applications of MLM are numerous. It is useful on pathologies such as edema, chronic pain, chronic inflammation, trauma, scarring processes and low immune processes. It can also be readily applied to different tissue such as the skin, mucosa, fascia, muscles, viscera, perosteum, organ of the senses, dura and pia.¹

Historical Background

While there is still much to learn about the lymphatic system as a whole, one aspect that is undisputed by the scientific community is the existence of the lymphatic rhythm.

The presence of lymphatic contractions have been theorized since the 18th century.² Yet it wasn't until the late 1970s that Waldemar Olszewski conducted the first known scientific studies involving the specific measurement of lymphatic vessel contractility in man.^{3,4,5}

Olszewski initially used cannulation of lymph vessels in five randomly selected healthy male volunteers in the upright position. He recorded a specific lymphatic rhythm of six to eight contractions per minute, creating a pressure of 1 to 33 mm Hg. Other researchers (Schmid-Schönbein, Sjöberg, Wang, Zawieja) reported similar results, and soon hundreds of articles appeared in scientific literature related to human or animal lymphatic contractility.^{6,7,8,9,10} (See sidebar: "Body Rhythms: Biological Oscillators/Pacemaker Cells," page 105.)

The lymphatic system is composed of lymph capillaries (or initial lymphatics) that carry fluid from interstitial spaces to lymph capillaries, then to precollectors. From there, fluid is conveyed to larger vessels called lymph collectors. These collectors are approximately 100 to 600 microns (half a millimeter) in diameter—up to two millimeters in the thoracic duct.¹¹ They primarily consist of chains of muscular units called lymphangions—the "little hearts" in the lymph collectors (Mishin, 1961). These muscular units have extensive sympathetic and parasympathetic innervation, from the tunica media to the tunica externa, that are somewhat similar to the alpha and beta receptors found in blood vessels. Lymphangion units contract regularly throughout the lymphatic system, like small pacemakers, sending lymph in peristaltic waves (lymphangiomotoricity).

Osteopath F. P. Millard from Canada developed what is most likely the first specific manual approach to the lymphatic system. In 1922, he published *Applied Anatomy of the Lymphatics*, in which he used the term "lymphatic drainage" to describe techniques he had used on the skin and mucosa.¹² He claimed the techniques had helped him routinely treat more than 70 patients a morning.

Emil Vodder, doctor of philosophy and Danish practitioner, is best known for his brilliant insights into techniques for enhancing lymphatic circulation, which he developed with his wife between 1932 and 1936 in France.¹³

These two traditional approaches provided the background for the development of lymph drainage therapy. An original osteopathic hands-on method, LDT enables practitioners to manually evaluate the specific rhythm, direction, depth and quality of the lymphatic flow anywhere in the body.

The biological presence of lymphatic vessel contractility has definite clinical implications. Lymph should not be considered a passive medium. In other words, practitioners should not squeeze the lymph tissue as if it were a tube of toothpaste—as some schools still teach. The techniques used in LDT are very gentle, and naturally stimulate regular physiological contractions of the lymphangions if they have slowed down or stopped.

With training and practice, most therapists are able to attain the sensitivity required to evaluate the rhythm of the lymphatic flow. Therapists should develop this skill first before attempting to assess the direction of lymphatic flow using MLM. With MLM, practitioners are able to find alternative pathways for drainage in areas with lymphatic and interstitial fluid stagnation.

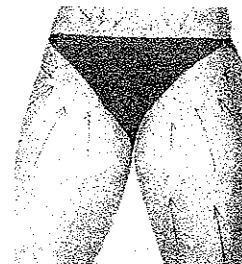
Lymphedema And MLM

The use of light hands-on pressure is of utmost importance in dealing with lymphedema. In fact, only those with specialized lymphedema training should ever work on this condition. Many schools offer certification programs for lymphedema work. The national “gold standard” is 120 to 180 hours. For those with the proper training, the treatment of edema and lymphedema can be greatly aided by the use of MLM.

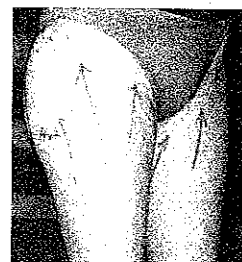
Research on lymphedema by Eliska and Eliskova showed that the few fragile lymphatic vessels that remain can easily be damaged.^{14,15} The maneuvers must be just enough to stimulate reabsorption and the automotoricity of the lymphangions and not to increase filtration from the blood capillaries. What is required is a “feather touch” equivalent to the weight of a dime or nickel (1 oz./cm² or 8 oz./in²). Any heavy pressure, such as deep-tissue work, is a clear contraindication for lymphedema. This is vital information that should be part of the teaching in all massage therapy schools.

Complete decongestive physiotherapy (CDP) is the noninvasive treatment of choice in the United

This shows a normal mapping of the lower extremities. The superficial lymph flow “converges” like sun rays toward the inguinal (groin) nodes. After training and practice, students should be able to palpate the rhythm and direction of the lymph flow, and identify affected and stagnant areas or organs in the body. The same technique can be applied to animals.



This is a case of local post-traumatic edema, a condition commonly encountered by many therapists. This 36-year-old client sustained a prolonged dog bite at 14 years of age. She presented a right chronic edema of the thigh and numbness in the lower extremity. The direction of the lymphatic flow was determined using MLM. The MLM helped to reveal the abnormal lymphatic pathways of this localized edema. You can compare the diverging pathways of the superficial lymph flow discovered through the MLM with the converging normal arrows of the previous photo.



This client's complaint paralleled the clinical signs often seen in cases of lymphatic stagnation: local pain, paresthesia (pain and needles) or some kind of discomfort, slight chronic swelling, limitation in hip range of motion, modification of skin coloration and inability to sleep on the affected side.

A few minutes after treatment, the client rerouted to a more physiologic pathway, the range of motion returned to normal values, and all clinical signs dramatically decreased. MLM was used to help evaluate the efficiency of the treatment. The next day she informed us that she had been able to sleep on the affected side.





This case offers a good illustration of how manually assessing lymphatic flow can be used in a difficult case of postsurgical complications. I saw this patient about two years after he had face-lift surgery. He complained of discomfort, numbness and a pulling sensation in the right side of the face. My medical training didn't prepare me for that. There were no real objective signs, no important swelling and the skin tension was acceptable for this kind of surgery. Most of the surgeons he had seen told him that nothing was obviously abnormal and he should wait—things should slowly evolve in a better direction. The alternative was to reopen the site to check for any postsurgical nerve impingement, but that was no guarantee.

Initial findings revealed that the superficial lymph and interstitial fluid circulation of the affected region was abnormal. The direction of the flow in this area of the face should go inferior.



The lymph drainage therapy application always tries to follow the specific rhythm, direction, depth and quality of the affected lymphatic flow. An advanced technique helps to naturally reroute the flow to a more physiological direction. The most important consideration in these cases is not to force the flow to where we assume it should go, even though it is a very strong temptation. We cannot force the lymph and interstitial fluids in the wrong direction, pushing them against the "path of least resistance," and expect them to stay where we forced them to go. We have to help nature in its way and work with the intelligence of the tissue. After treatment, final assessment showed a physiological direction for the lymph flow, a rhythm and quality in the normal range and a dramatic improvement in the client's condition.

In this specific case, one session was enough. One should keep in mind, however, that rapid, sometimes "spectacular," changes can only take place if the tissue did not develop fibrosis. In cases involving important fibrotic tissue, some specific techniques should be used first to alleviate fibrosis and release collagen fibers before attempting to switch fluid direction. Depending on the case, the process can be much more time-consuming.

States for lymphedema patients.^{16,17,18,19,20,21,22} It is recognized and reimbursed by a growing number of national insurance companies. This is the method taught in a lymphedema certification class. The emphasis of the manual component of CDP is to create alternative pathways through which lymph and interstitial fluid can flow. Manual techniques to accomplish this are used daily in lymphedema clinics.

During the testing process for LDT's Lymphedema /CDP Certification (LLCC), MLM is used to help identify the areas of fluid restriction and fibrosis and find the best alternate pathways to reroute these stagnant areas. One of the main contributions of MLM is that it gives practitioners the information needed to specifically reroute an edematous area. They do not have to rely on making an "educated" guess. Using mapping techniques, practitioners report faster volume reduction for extremity lymphedema and fewer visits needed during the course of treatment.

Once the reroute has been identified and stabilized, and the alternate pathways established, the therapist can determine a physical treatment plan. This may include a protocol for client self-drainage, along with different phases of exercises the client needs to perform under compression. The specific rerouting information can also be used to check the efficiency of the bandaging or garment applications. The findings may direct the therapist to create a custom garment, such as Legacy[®] or Jovi[®], or the information may indicate the direction in which the therapist should apply Kinesiotape[®].

The Reliability Of MLM

A study is currently underway to scientifically demonstrate the reliability of the manual lymphatic mapping technique.

The results of MLM performed by a control group of therapists with no training in the technique are being compared to those of an experimental group with minimal training in introductory MLM techniques (LDT, second level). (The experimental group is not comprised of any LDT-certified therapists.)

The results to date indicate that the proportion of correct responses in the control versus experimental groups is highly statistically significant. It is extremely unlikely that the difference is due to chance variation. The chi-square analysis ($X^2 = 329.54, p < 0.0000001$)

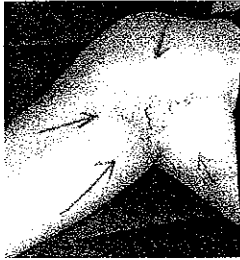
Body Rhythms: Biological Oscillators/Pacemaker Cells

Numerous body rhythms have been observed by science. This table lists those rhythms whose existence has been recognized. Not all these rhythms have gained the scientific documentation required to prove their existence and their function.

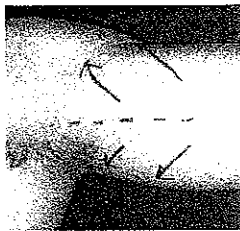
1 Hz (Hertz) = 1 cycle per second

Breathing Cycles	0.25–0.35 Hz (15–21 cycles/min)
Cardiac And Vascular Rhythms	
• Pulse:	(65 to 85 cycles/min)
• Heart Rate Variability (HRV):	0.1 Hz (6 cycles/min)
• Traube-Hering Waves: (spontaneous modulation of systemic blood pressure)	0.1 Hz
Brain And Nervous System Rhythms	
• Primary Respiratory Mechanism:	About 0.1–0.2 Hz (6–12 cycles/min) (Sutherland, 1939)
• Long Tide:	About 0.01 Hz (Sutherland)
• Slow Brain Waves:	0.1 Hz
• Glial Cell Pulsation (<i>Lumsden & Pomerat, 1951</i>)	
• Cortical Oxidative Metabolism Oscillations (<i>Vern, 1988</i>)	
• Electrical Rhythm Of Cortical Neurons (<i>Llinas, 1993</i>)	
• CSF Synchronicity With Cardiac Systole (<i>Diehl, 1991</i>)	
• Autonomic Nerve Activation/Phrenic Nerve Discharge (<i>Barman & Gebber, 1976</i>)	
Lymphatic Rhythm	0.05–0.1 Hz (Smith 1949, Kinmonth, 1956, Olszewski & Engeset, 1979)
Visceral Rhythm	
• Visceral Motility:	0.1–0.13 Hz (Barral, 1986)
• Colonic Myoelectric Activity:	0.1–0.2 Hz (6–12 cycles/min)
• Slow Peristaltic Waves: (smooth muscles of the GI tract)	0.033–0.066 (2–4 cycles/min)
Hormonal Rhythms	
• Cortisol, insulin, blood sugar, growth hormone, etc.	
Thermal Regulation	Very low frequency: 0.05 Hz
Ionic Rhythm	
• Cellular Calcium Level:	0.1 Hz
Immune Circulation Rhythms	
Circadian Rhythm:	About every 24 hours
Circatidal:	Approximately monthly
Other Rhythms	Every 90 min (HRV, thermal regulation)

Credit: Chart above from *Silent Waves: Theory and Practice of Lymph Drainage Therapy* (Chikly, 2001).



This client developed lymphedema of the upper extremity following surgery. This occurs in approximately 15 to 35 percent of patients after node dissection (surgical removal of axillary nodes) or radiation for breast cancer. This is the superficial MLM of the unaffected upper arm, medial aspect. All the circulation physiologically converges toward the healthy axilla.



The affected arm here presents a totally different fluid direction in its medial aspect, with a pathological "water divide" or lymph "watershed" that is commonly seen in these situations. The lymph flow spontaneously diverges from the axilla and seeks alternate pathways. After surgery and/or radiation, the axilla can present a high degree of resistance to the flow. The practitioner's job is to facilitate this process of rerouting and help the tissue find the best alternate pathways that can efficiently evacuate the excess fluid.



Manual lymphatic mapping identifies a spontaneous reroute toward the posterior ipsilateral inguinal lymphotome, along with an area of stagnation (dotted area) toward the contralateral axilla. The lymph is not crossing the posterior sagittal watershed to join the nonaffected contralateral (opposite) axilla. These natural alternate pathways taken by the tissue are still not efficient enough to completely reduce the postsurgical lymphedema.



Using specific LDT strokes and the "switch" technique, the therapist helps lymph and interstitial fluid create natural lymphatic reroutes. The practitioner helps lymph "choose" an alternate pathway—in this case, the contralateral axilla as well as a second reroute, the posterior axilla-axillary pathway. Two efficient shunts or reroutes are now stabilized. The next objective of the therapist can be to help reroute the rest of the upper extremity. Working proximally to distally helps alleviate the entire edematous pathology.

essentially indicates that the probability is > 99.9999999 percent that the ability of the experimental group (compared to control group) to palpate the MLM is not due to random chance.

If the results of this study are confirmed, it will seem to indicate that MLM can be objectively felt by a trained group, that manual therapists can feel such minute structures as fluid flow in the body, and, finally, that the results of these manual findings are reliable.

You can read more about the preliminary findings of the MLM study at [www.upledger.com/mlmstudy.htm].

The body's lymphatic system is a wondrous structure that is becoming more and more understood. Through advances in the field of lymphology, lymphatic techniques and other scientific discoveries, great headway is being made in our ability to alleviate difficult conditions.

The advent of MLM, in particular, provides therapists a consistently accurate means whereby they can detect and redirect stagnated fluid flow and track progress as it is occurring—all by using the lymphatic and interstitial fluid pathways as guides.

The inclination may be to say it is impossible to feel such a small structure of the human body. I understand that, and I have to agree. It is nearly impossible...until a person has been trained in and has practiced the technique. Manual assessment of the lymphatic rhythm and direction requires time and dedication. But with that skill comes tremendous possibilities for therapeutic intervention when integrated in a massage therapist's practice. 📌

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Manual lymphatic mapping is used to help identify the areas of fluid restriction and fibrosis and find the best alternate pathways to reroute these stagnant areas...it gives practitioners the information needed to specifically reroute an edematous area. They do not have to rely on making an "educated" guess.

More information about lymph drainage therapy workshops is available at: 1-800-233-5880, or [www.upledger.com].

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