

Collected Scientific Research Relating to the Use of Osteopathy with Lymphatic Throughput

Important:

1) Osteopathy involves helping people's own self-healing abilities to work better, rather than focussing primarily on particular conditions.

2) Each person is different, and osteopathy treats them differently.

Therefore people respond to osteopathic treatment in different ways. Treatments that work for one person cannot be guaranteed to work for another person in the same way. The fact that there is scientific research supporting a treatment in a group of people does not mean that it will always work in the same way (which is probably true of all research).

A number of things make research into osteopathy challenging. These include the two aspects of osteopathy mentioned above, and also the lack of major commercial interests to provide funding in expectation of financial returns. At the same time, there is an emerging body of research demonstrating the usefulness of osteopathic treatment.

Please note: there is room for debate about the classifications used for these studies. Please let John Smartt know if you believe that any of these classifications are incorrect.

These studies are from peer-reviewed journals

Number of studies: 9

Clinically and statistically significant results

Number of studies: 9

Other reviews

Number of studies: 1

Hodge LM, Downey HF. 2011 **Lymphatic pump treatment enhances the lymphatic and immune systems**. *Exp Biol Med* Oct;236(10):1109-15 <http://www.ncbi.nlm.nih.gov/pubmed/21865405>

"The osteopathic medical profession has long advocated the use of osteopathic lymphatic pump treatments (LPT) to improve lymphatic circulation, reduce edema and combat infectious disease. However, until recently, there was no scientific evidence that LPT enhances function of the lymphatic and immune systems. This review discusses the physiological functions of the lymphatic system, the ability of LPT to increase lymph flow under normal and experimental conditions, the clinical benefits of LPT, current research models for the study of LPT and the potential mechanisms by which LPT enhances lymphatic and immune function."

Randomised controlled trials

Number of studies: 2

Molski P, Kruczyński J, Molski A, Molski S. 2013 **Manual lymphatic drainage improves the quality of life in patients with chronic venous disease: a randomized controlled trial**. *Arch Med Sci* Jun 20;9(3):452-8 <http://www.ncbi.nlm.nih.gov/pubmed/23847666>

"The MLD [manual lymphatic drainage] alone significantly reduced FV [fluid volume] in patients with CVD [chronic vascular disease], also improving their QoL [quality of life]. The MLD applied in CVD patients at the preoperative stage results in better surgical outcome, which is demonstrated by reduced disease progression, FV reduction and improvement in the QoL."

Saggio G, Docimo S, Pilc J, Norton J, Gilliar W. 2011 **Impact of osteopathic manipulative treatment on secretory immunoglobulin A levels in a stressed population**. *J Am Osteopath Assoc* Mar;111(3):143-7 <http://www.ncbi.nlm.nih.gov/pubmed/21464262>

"High levels of human secretory immunoglobulin A (sIgA) have been shown to decrease the incidence of acquiring upper respiratory tract infections. Osteopathic manipulative treatment (OMT) has been shown to improve cardiac indices, increase lymph flow rates through the thoracic duct, and decrease sympathetic tone in postoperative patients and those in intensive care. Therefore, we hypothesized that OMT may also increase sIgA levels in people under high levels of emotional and psychological stress, thereby enhancing immunity and potentially preventing subsequent infections."

"This study demonstrates the positive effect of OMT on sIgA levels in persons experiencing high stress. Results suggest that OMT may then have therapeutic preventive and protective effects on both healthy and hospitalized patients, especially those experiencing high levels of emotional

Case controlled studies

Number of studies: 1

Tan IC, Maus EA, Rasmussen JC, Marshall MV, Adams KE, Fife CE, Smith LA, Chan W, Sevick-Muraca EM. 2011 **Assessment of lymphatic contractile function after manual lymphatic drainage using near-infrared fluorescence imaging** Arch Phys Med Rehabil May;92(5):756-764.e1. <https://www.ncbi.nlm.nih.gov/pubmed/21530723>

OBJECTIVE:

To investigate the feasibility of assessing the efficacy of manual lymphatic drainage (MLD), a method for lymphedema (LE) management, by using near-infrared (NIR) fluorescence imaging.

DESIGN:

Exploratory pilot study.

SETTING:

Primary care unit.

PARTICIPANTS:

Subjects (N=10; age, 18-68y) with a diagnosis of grade I or II LE and 12 healthy control subjects (age, 22-59y).

INTERVENTION:

Indocyanine green (25 µg in 0.1 mL each) was injected intradermally in bilateral arms or legs of subjects. Diffused excitation light illuminated the limbs, and NIR fluorescence images were collected by using custom-built imaging systems. Subjects received MLD therapy, and imaging was performed pre- and posttherapy.

MAIN OUTCOME MEASURES:

Apparent lymph velocities and periods between lymphatic propulsion events were computed from fluorescence images. Data collected pre- and post-MLD were compared and evaluated for differences.

RESULTS:

By comparing pre-MLD lymphatic contractile function against post-MLD lymphatic function, results showed that average apparent lymph velocity increased in both the symptomatic (+23%) and asymptomatic (+25%) limbs of subjects with LE and control limbs (+28%) of healthy subjects. The average lymphatic propulsion period decreased in symptomatic (-9%) and asymptomatic (-20%) limbs of subjects with LE, as well as in control limbs (-23%).

CONCLUSIONS:

We showed that NIR fluorescence imaging could be used to quantify immediate improvement of lymphatic contractile function after MLD.

Pereira De Godoy JM, Franco Brigidio PA, Salles Cunha SX, Batigália F, De Fatima Guerreiro Godoy M. 2013 **Mobilization of fluids in large volumetric reductions during intensive treatment of leg lymphedema.** *Int Angiol* Oct;32(5):479-82. <http://www.ncbi.nlm.nih.gov/pubmed/23903306>

"AIM:

The aim of the current study was to evaluate fluid mobilization during the intensive treatment of leg lymphedema.

METHODS:

The mobilization of intracellular and extracellular fluids in the lower and upper extremities and trunk was evaluated with the intensive treatment of leg lymphedema in a prospective study. Mobilization of fluids was assessed by bioelectrical impedance using the InBody S10 device in ten patients with leg lymphedema, regardless of the cause. Treatment consisted of six to eight hours per day of Manual Lymphatic Therapy (Godoy & Godoy technique), Mechanical Lymphatic Therapy (RAGodoy device®) and a non-elastic cotton-polyester stocking.

RESULTS AND CONCLUSION:

A significant reduction in total water was observed for the lymphedematous limb, but with an increase in intracellular water of from 59% to 61%. Additionally, total water increases were observed in the limbs without lymphedema and in the trunk. There was an increase in total intracellular water of the extremities and trunk, but without any change in the extracellular water. In high-volume reductions during lymphedema treatment, fluids are displaced from the lymphedematous limb to extremities without lymphedema and to the trunk."

Castillo R, Schander A, Hodge LM 2018 **Lymphatic Pump Treatment Mobilizes Bioactive Lymph That Suppresses Macrophage Activity In Vitro** J Am Osteopath Assoc July 2018, Vol. 118, 455-461 <http://jaoa.org/article.aspx?articleid=2686417>

"Context: By promoting the recirculation of tissue fluid, the lymphatic system preserves tissue health, aids in the absorption of gastrointestinal lipids, and supports immune surveillance. Failure of the lymphatic system has been implicated in the pathogenesis of several infectious and inflammatory diseases. Thus, interventions that enhance lymphatic circulation, such as osteopathic lymphatic pump treatment (LPT), should aid in the management of these diseases. Objective: To determine whether thoracic duct lymph (TDL) mobilized during LPT would alter the function of macrophages in vitro.

Methods: The thoracic ducts of 6 mongrel dogs were cannulated, and TDL samples were collected before (baseline), during, and 10 minutes after LPT. Thoracic duct lymph flow was measured, and TDL samples were analyzed for protein concentration. To measure the effect of TDL on macrophage activity, RAW 264.7 macrophages were cultured for 1 hour to acclimate. After 1 hour, cell-free TDL collected at baseline, during LPT, and after TDL was added at 5% total volume per well and co-cultured with or without 500 ng per well of lipopolysaccharide (LPS) for 24 hours. As a control for the addition of 5% TDL, macrophages were cultured with phosphate-buffered saline (PBS) at 5% total volume per well and co-cultured with or without 500 ng per well of LPS for 24 hours. After culture, cell-free supernatants were assayed for nitrite (NO₂⁻), tumor necrosis factor α (TNF- α) and interleukin 10 (IL-10). Macrophage viability was measured using flow cytometry.

Results: Lymphatic pump treatment significantly increased TDL flow and the flux of protein in TDL ($P < .001$). After culture, macrophage viability was approximately 90%. During activation with LPS, baseline TDL, TDL during LPT, and TDL after LPT significantly decreased the production of NO₂⁻, TNF- α , and IL-10 by macrophages ($P < .05$). However, no significant differences were found in viability or the production of NO₂⁻, TNF- α , or IL-10 between macrophages cultured with LPS plus TDL taken before, during, and after LPT ($P > .05$).

Conclusion: The redistribution of protective lymph during LPT may provide scientific rationale for the clinical use of LPT to reduce inflammation and manage edema."

Huff JB, Schander A, Downey F, Hodge LM 2010 **Lymphatic Pump Treatment Augments Lymphatic Flux of Lymphocytes in Rats** Lymphat Res Biol Dec; 8(4): 183–187 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3025762/>

"Background

Lymphatic pump techniques (LPT) are used by osteopathic practitioners for the treatment of edema and infection; however, the mechanisms by which LPT enhances the lymphatic and immune systems are poorly understood.

Methods and Results

To measure the effect of LPT on the rat, the cisterna chyli (CC) of 10 rats were cannulated and lymph was collected during 4 min of 1) pre-LPT baseline, 2) 4 min LPT, and 3) 10 min post-LPT recovery. LPT increased significantly ($p < 0.05$) lymph flow from a baseline of $24 \pm 5 \mu\text{l}/\text{min}$ to $89 \pm 30 \mu\text{l}/\text{min}$. The baseline CC lymphocyte flux was $0.65 \pm 0.21 \times 10^6$ lymphocytes/min, and LPT increased CC lymphocyte flux to $6.10 \pm 0.99 \times 10^6$ lymphocytes/min ($p < 0.01$). LPT had no preferential effect on any lymphocyte population, since total lymphocytes, CD4⁺ T cells, CD8⁺ T cells, and B cell numbers were similarly increased. To determine if LPT mobilized gut-associated lymphocytes into the CC lymph, gut-associated lymphocytes in the CC lymph were identified by staining CC lymphocytes for the gut homing receptor integrin $\alpha 4\beta 7$. LPT significantly increased ($p < 0.01$) the flux of $\alpha 4\beta 7$ positive CC lymphocytes from a baseline of $0.70 \pm 0.03 \times 10^5$ lymphocytes/min to $6.50 \pm 0.10 \times 10^5$ lymphocytes/min during LPT. Finally, lymphocyte flux during recovery was similar to baseline, indicating the effects of LPT are transient.

Conclusions

Collectively, these results suggest that LPT may enhance immune surveillance by increasing

the numbers of lymphocytes released in to lymphatic circulation, especially from the gut associated lymphoid tissue. The rat provides a useful model to further investigate the effect of LPT on the lymphatic and immune systems."

Hodge LM, King HH, Williams AG Jr, Reder SJ, Belavadi T, Simecka JW, Stoll ST, Downey HF. 2007 **Abdominal lymphatic pump treatment increases leukocyte count and flux in thoracic duct lymph.** *Lymphat Res Biol* 5(2):127-33. <http://www.ncbi.nlm.nih.gov/pubmed/17935480>

"LPT [lymphatic pump technique] significantly increased both thoracic duct lymph flow and leukocyte count, so lymph leukocyte flux was markedly enhanced. Increased mobilization of immune cells is likely and important mechanism responsible for the enhanced immunity and recovery from infection of patients treated with LPT."

Knott EM, Tune JD, Stoll ST, Downey HF 2005 **Increased lymphatic flow in the thoracic duct during manipulative intervention.** *J Am Osteopath Assoc* Oct;105(10):447-56 <http://www.ncbi.nlm.nih.gov/pubmed/16314677>

"The thoracic pump and the abdominal pump are osteopathic manipulative (OM) lymphatic pump techniques frequently used by osteopathic physicians to treat patients with infections (eg, pneumonia, otitis media). Although there is a widely accepted belief among the osteopathic medical profession that increasing lymphatic flow is beneficial, no measurements of lymph flow during osteopathic manipulative treatment have been reported. The authors surgically instrumented five mongrel dogs to record lymphatic flow in the thoracic duct (TDF) and cardiac variables during three intervention protocols. After recovery from surgery, canine subjects were placed in a standing-support sling, and TDF, cardiac output, mean aortic blood pressure, and heart rate were recorded during two randomized 30-second sessions of manipulative intervention using the osteopathic thoracic pump and abdominal pump techniques on two successive days. Lymph flow in the thoracic duct increased from 1.57±0.20 mL x min⁻¹ to a peak TDF of 4.80±1.73 mL x min⁻¹ during abdominal pump, and from 1.20±0.41 mL x min⁻¹ to 3.45±1.61 mL x min⁻¹ during thoracic pump. Lymph flow in the thoracic duct and cardiac variables were also recorded for canine subjects during physical activity (ie, treadmill exercise at 3 miles per hour at 0% incline). During physical activity, TDF increased from 1.47±0.33 mL x min⁻¹ to 5.81±1.30 mL x min⁻¹. Although cardiac variables did not change significantly during manipulative intervention with lymphatic pump techniques, cardiac output and heart rate did increase during physical activity. The authors conclude that physical activity and manipulative intervention using thoracic pump and abdominal pump techniques produced net increases in TDF (P<.05)."