

Collected Scientific Research Relating to the Use of Osteopathy with Inflammation and immune regulation

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.

More research is being done all of the time. I am not aware of any research which shows that osteopathic treatment, delivered by a qualified osteopath, is ineffective in relation to this area. If you are aware of any studies that show that, please bring them to my attention.

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:
6

Clinically and statistically significant results

Number
of studies:
6

Systematic reviews

Number of studies: 1

Yao S, Hassani J, Gagne M, George G, Gilliar W. 2014 **Osteopathic manipulative treatment as a useful adjunctive tool for pneumonia.** *J Vis Exp* May 6;(87) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4173698/>

"Under the current Infectious Disease Society of America/American Thoracic Society guidelines, standard-of-care recommendations include the rapid administration of an appropriate antibiotic regiment, fluid replacement, and ventilation (if necessary). Non-standard therapies include the use of corticosteroids and statins; however, these therapies lack conclusive supporting evidence (4). (Figure 1) Osteopathic Manipulative Treatment (OMT) is a cost-effective adjunctive treatment of pneumonia that has been shown to reduce patients' length of hospital stay, duration of intravenous antibiotics, and incidence of respiratory failure or death when compared to subjects who received conventional care alone (5). The use of manual manipulation techniques for pneumonia was first recorded as early as the Spanish influenza pandemic of 1918, when patients treated with standard medical care had an estimated mortality rate of 33%, compared to a 10% mortality rate in patients treated by osteopathic physicians (6). When applied to the management of pneumonia, manual manipulation techniques bolster lymphatic flow, respiratory function, and immunological defense by targeting anatomical structures involved in these systems(7,8, 9, 10). The objective of this review video-article is three-fold: a) summarize the findings of randomized controlled studies on the efficacy of OMT in adult patients with diagnosed pneumonia, b) demonstrate established protocols utilized by osteopathic physicians treating pneumonia, c) elucidate the physiological mechanisms behind manual manipulation of the respiratory and lymphatic systems. Specifically, we will discuss and demonstrate four routine techniques that address autonomics, lymph drainage, and rib cage mobility: (1) Rib Raising, (2) Thoracic Pump, (3) Doming of the Thoracic Diaphragm, and (4) Muscle Energy for Rib 1."

Walkowski S, Singh M, Puertas J, Pate M, Goodrum K, Benencia F, 2014 **Osteopathic Manipulative Therapy Induces Early Plasma Cytokine Release and Mobilization of a Population of Blood Dendritic Cells**. PLoS One Mar, Vol. 9 Issue 3, p1-12. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3948629/>

"Recently, it has been shown in human patients suffering chronic low back pain, that OMT [osteopathic manipulative therapy] is able to modify the levels of cytokines such as IL-6 and TNF- α in blood upon repeated treatment. Further, experimental animal models show that lymphatic pump techniques can induce a transient increase of cytokines in the lymphatic circulation. Taking into account all these data, we decided to investigate in healthy individuals the capacity of OMT to induce a rapid modification of the levels of cytokines and leukocytes in circulation. Human volunteers were subjected to a mixture of lymphatic and thoracic OMT, and shortly after the levels of several cytokines were evaluated by protein array technology and ELISA multiplex analysis, while the profile and activation status of circulating leukocytes was extensively evaluated by multicolor flow cytometry."

"A significant decrease in the proportion of a subpopulation of blood dendritic cells was detected in OMT patients. Significant differences were also detected in the levels of immune molecules such as IL-8, MCP-1, MIP-1 α and most notably, G-CSF. Thus, OMT is able to induce a rapid change in the immunological profile of particular circulating cytokines and leukocytes."

Degenhardt BF, Darmani NA, Johnson JC, Towns LC, Rhodes DC, Trinh C, McClanahan B, DiMarzo V. 2007 **Role of osteopathic manipulative treatment in altering pain biomarkers: a pilot study**. J Am Osteopath Assoc Sep;107(9):387-400 <http://www.ncbi.nlm.nih.gov/pubmed/17908831>

"In a prospective, blinded assessment, blood was collected from 20 subjects (10 with chronic low back pain [LBP], 10 controls without chronic LBP) for 5 consecutive days. On day 4, OMT was administered to subjects 1 hour before blood collection. Blood was analyzed for levels of beta-endorphin (betaE), serotonin (5-hydroxytryptamine [5-HT]), 5-hydroxyindoleacetic acid (5-HIAA), anandamide (arachidonylethanolamide [AEA]), and N-palmitoylethanolamide (PEA). A daily questionnaire was used to monitor confounding factors, including pain and stress levels, sleep patterns, and substance use."

"Increases from baseline in betaE and PEA levels and a decrease in AEA levels occurred immediately posttreatment. At 24 hours posttreatment, similar biomarker changes from baseline were observed. A decrease in stress occurred from baseline to day 5. The change in PEA from baseline to 24 hours posttreatment correlated with the corresponding changes in stress. Subgroup analysis showed that subjects with chronic LBP had significantly reduced 5-HIAA levels at 30 minutes posttreatment ($P=.05$) and 5-HT levels at 24 hours posttreatment ($P=.02$) when compared with baseline concentrations. The increase in PEA in subjects with chronic LBP at 30 minutes posttreatment was two times greater than the increase in control subjects."

"Concentrations of several circulatory pain biomarkers were altered after OMT. The degree and duration of these changes were greater in subjects with chronic LBP than in control subjects without the disorder."

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."

Zein-Hammoud M, Standley PR. 2015 **Modeled Osteopathic Manipulative Treatments: A Review of Their in Vitro Effects on Fibroblast Tissue Preparations.** J Am Osteopath Assoc Aug 1;115(8):490-502 <https://jaoa.org/article.aspx?articleid=2422100>

"Although modeled RMS [repetitive motion strain] produced a delayed inflammatory response and reduction in cellular proliferation, both modeled CS [counter strain] and MFR [myofascial release] reversed those effects."

"Herein, we have shown proof of concept that both clinical CS and clinical MFR may equivalently reverse RMS injury in patients in manners that affect cytokine and NO signaling as well as cellular proliferation."

"Further, these findings suggest that dose-dependent and prophylactic MFR may potentially regulate inflammation and wound healing responses in patients."

"If clinically translatable, our results suggest that although RMS would clinically reduce the ability to regenerate and repair muscles, MFR would enhance these effects. "

Schander A, Downey HF, Hodge LM. 2012 **Lymphatic pump manipulation mobilizes inflammatory mediators into lymphatic circulation.** Exp Biol Med (Maywood) Jan;237(1):58-63 <http://www.ncbi.nlm.nih.gov/pubmed/22169162>

This re-distribution of inflammatory mediators during LPT [lymphatic pump technique] may provide scientific rationale for the clinical use of LPT to enhance immunity and treat infection.