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CLINICAL PROOF BOOK

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JOURNAL PUBLICATIONS

Development of a Musculoskeletal Ultrasound Protocol to Examine Upper Extremity Rehabilitation Outcomes in Systemic Sclerosis

Murphy, S. L., Krause, D., Roll, S. C., Gandikota, G., Barber, M. & Khanna, D. *Journal of Diagnostic Medical Sonography*. November 2020. doi:10.1177/8756479320965210

Objectives: This study developed a musculoskeletal ultrasound (MSUS) protocol to evaluate rehabilitation outcomes in systemic sclerosis.

Materials and Methods: Three MSUS methods (gray-scale, Doppler, strain elastography) and two acquisition techniques (long- vs short-axis; transducer on skin vs floating on gel) were examined in the forearm before and after rehabilitation treatment. For gray-scale, tissue thickness measures and intrarater and interrater reliability were calculated (intraclass correlation coefficients [ICCs]), and paired t tests examined differences among techniques.

Results: Five people with diffuse cutaneous systemic sclerosis participated. The most valid and reliable gray-scale technique was with the transducer in long-axis, floating on gel. Doppler and strain elastography did not detect changes. Both dermal and subcutaneous thickness measurement error was small; intrarater and interrater reliability was good to excellent. Preliminary data indicate that treatment may lead to dermal thinning.

Conclusion: A replicable protocol was established and may be an adjunct to rehabilitation outcome measurement in systemic sclerosis.

Reduction of Postoperative Swelling with a Negative Pressure Treatment - A Prospective Study

Saul, D., Fischer, A.C., Wolfgang L. & Dresing, K. 2020. *Journal of Orthopaedic Surgery* 28(2), 1-5. May 2020. doi:10.1177/2309499020929166.

Purpose: Perioperative swelling and edema are the main factors that influence the time to definitive operative care, healing rate, as well as postoperative infection rate. Device-based negative pressure treatment is a new method to reduce post-traumatic and postoperative swelling of the upper extremities. The objective of this study was to evaluate a new negative pressure treatment with LymphaTouch® (Helsinki, Finland) to reduce perioperative swelling in upper extremity injuries.

Methods: We analyzed 45 patients (26 female and 19 male) after operative treatment of upper extremity injuries. A predefined treatment algorithm of 30 min using LymphaTouch® was performed on the patients every day for five consecutive days. Swelling was measured according to the neutral-zero method with six points of measurement.

Results: A total of 16 patients underwent an operation on their upper arm. An average of 3.5 measurements was performed per patient, with the start of therapy at a mean of 5.13 days after the operation. All of the measured circumferences except the elbow and 10 cm below the elbow were reduced from day 0 to 3. The percent reduction of swelling (relative to day 0) was 10.36%, 11.35%, 17.34%, and 3.25% for days 1–4, respectively. The greatest reduction of circumference was obtained in the metacarpus (51.6%) and wrist (33.1%).

Conclusion: The LymphaTouch® system and a 30-min treatment program can reduce postoperative swelling of the upper arm, wrist, and hand on the first 5 days after surgery. The ease of learning and self-applicability of LymphaTouch® makes it interesting for further controlled randomized trials.

Effects of Negative Pressure Soft Tissue Therapy to Ankle Plantar Flexor on Muscle Tone, Muscle Stiffness, and Balance Ability in Patients with Stroke

Kim, K. R., Shin, H. S., Lee, S. B., Hwang, H. S., & Shin, H. J. 2018. Journal of International Academy of Physical Therapy Research (JIAPTR), 9(2), 1468-1474. <https://doi.org/10.20540/JIAPTR.2018.9.2.1468>

Purpose: To investigate the immediate effects of negative pressure soft tissue therapy on muscle tone, muscle stiffness and balance in patients with stroke.

Methods: In total, 20 patients with stroke and assigned to the negative pressure soft tissue therapy group (NPST, n=10) or, placebo-negative pressure soft tissue therapy group (Placebo-NPST, n=10). Both groups underwent NPST or placebo-NPST once a day during the experimental period. MyotonPRO was used to assess the parameters for muscle tone and stiffness. Biorescue was used to assess the parameters for balance.

Results: Each group showed improvements in muscle tone, muscle stiffness, and balance ability ($p < .05$). Especially, Muscle tone, muscle stiffness, and anterior length in the limit of stability were the significant improvement on NPST group ($p < .05$). The results of the study suggest that the NPST is effective in improving muscle tone, muscle stiffness, and balance ability in patients with stroke.

Occupational Therapy Treatment To Improve Upper Extremity Function In Individuals With Early Systemic Sclerosis: A Pilot Study

Murphy, S. L., Barber, M. W., Homer, K., Dodge, C., Cutter, G. R. & Khanna, D. 2018. Arthritis Care & Research, 70(11), 1653-1660. <https://doi.org/10.1002/acr.23522>

Objective: To determine feasibility and preliminary effects of an occupational therapy treatment to improve upper extremity (UE) function in patients with early systemic sclerosis (SSc) who have UE contractures.

Methods: A one-arm pilot clinical rehabilitation trial was conducted at a university health system. Participants with SSc and ≥ 1 UE contractures (N=21) participated in a total eight weekly in-person occupational therapy sessions. The therapy consisted of thermal modalities, tissue mobilization, and UE mobility. Between sessions, participants were instructed to complete UE home exercises. Feasibility was measured by present enrollment and session attendance and duration. The primary outcome measure was QuickDASH, secondary and exploratory outcomes included PROMIS physical function, objective UE measures, and skin thickening. Linear-mixed models were performed to determine treatment effects on primary and secondary outcomes.

Results: Fifty percent (24/48) of potentially eligible participants were interested. Of those, 88 % (21/24) enrolled; and 19 out of 21 (91%) completed the sessions. The mean (SD) age was 47.9 years (± 16.1); 100 % had diffuse SSc, and mean disease duration was 3.1 years. At eight weeks, participants reported statistically significant improvement on QuickDash and PROMIS physical function measures ($p = .0012$ and $p = .00$). Forty – seven and 53 % percent of the sample achieved improvements that exceeded minimally important difference.

Conclusion: In-person treatment sessions were feasible for individuals with SSc and demonstrated statistically significant and clinically meaningful improvements on UE and physical function. Future studies need to examine effects against a control condition and examine durability of treatment effects.

Negative Pressure Therapy In The Management Of Lymphoedema

Gott, F. H., Ly, K., Piller, N. & Mangion, A. 2018. *Journal of Lymphoedema*, 13 (1).

Abstract: Lymphoedema involves chronic tissue inflammation with tissue changes that include extracellular free fluid accumulation, tissue fibrosis and fatty tissue deposition (Zampell, 2012). Despite the best efforts of modern conservative lymphatic therapy, some patients will progress to develop significant secondary tissue changes with morbidity evident via recurrent bouts of cellulitis, reduced function and lowered quality of life. Fatty tissue deposition can contribute to such severity that liters of accumulated fatty tissue warrant surgical management via liposuction (Brorson 2006). Non-invasive and painless technology should, therefore, be of interest to lymphatic therapists aiming to improve the outcomes of conservative lymphatic therapy. Historically, conservative lymphatic therapy treatments have consisted of treatments that predominant via offering positive pressure; a pushing force onto the tissues. Compression bandaging, pressure garments, including wraps and chip bags, and massage, including manual lymphatic drainage and pneumatic compression devices, represent examples of positive pressure therapy and technology. Negative pressure, on the other hand, is a newer means offering treatment, whereby a pulling or opening force is applied to the tissues. Treatment can be targeted to specific areas, such as areas of radiation induced fibrosis and scar tissue, or the technology can be used as an adjunct to massage and manual lymphatic drainage.

Brands such as LymphaTouch (LymphaTouch Inc) and Endermologie (LPG) are examples of negative pressure massage devices designed for use by manual therapist. This article introduces technology to lymphoedema management and the proposed mechanics of action.

Modeling Of Interstitial Fluid Movement In Soft Tissue Under Negative Pressure–Relevance To Treatment Of Tissue Swelling

Iivarinen, J. T., Korhonen, R. K., & Jurvelin, J. S. 2016. *Computer Methods In Biomechanics And Biomedical Engineering*, 19(10), 1089-1098. <https://doi.org/10.1080/10255842.2015.1101073>

Abstract: Journal publication that uses computer-based finite-element model of soft tissue to analyze how pulsating and continuous modes in LymphaTouch device affect fluid flow, velocity, and pressure. The model response was matched with negative pressure (suction) measurements in human (N=11) forearm. Two experimental suction protocols were simulated to evaluate their impact on interstitial fluid flow in soft tissues. Simulated continuous suction was up to 27 times more efficient in fluid transportation compared to the cyclic suction.

A finite-element model was created using pQCT imaging and by doing measurements of soft tissue response to negative pressure on eleven healthy volunteers (nine males, two women). The negative pressure and suction protocols were performed using LymphaTouch device and the registered data was analyzed using Matlab software.

Two protocols were analyzed, cyclic and continuous. The simulated cyclic procedure consisted of five 100mmHg suction and 1cm lengthwise movement. The pulsation was set at 2 s (one second suction, one second zero-pressure period). Similarly, the continuous treatment protocol consisted of one 100mmHg suction with simultaneous 4 cm (in 4 s) lengthwise movement at a constant speed of the suction head.

The study found that the continuous suction method with simultaneous change of treatment position induced higher fluid pressure, velocity transients, and more effective fluid movement along the treatment direction than the cyclic method. It is to be noted that the model does not take into account how negative pressure treatment of edema may affect pressure-dependent promotion of the interstitial fluid flow into lymphatic system and/or activation of the lymphatic system in transportation of lymph fluid. In other words, the role of



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lymphatic system is not included in the model, meaning that the conclusion stating that continuous mode is more effective for moving fluid, applies better in areas where lymphatic system does not fully work.

Experimental And Computational Analysis Of Soft Tissue Mechanical Response Under Negative Pressure In Forearm

Iivarinen, J. T., Korhonen, R. K., Julkunen, P. & Jurvelin, J. S. 2013. Skin Research and Technology, 19(1), e356-e365. <https://doi.org/10.1111/j.1600-0846.2012.00652.x>.

Background: Instrumentation, relying on the use of negative pressure (suction), has been introduced to reduce pathological tissue swelling. Then relative contribution of skin, adipose tissue and muscle, to overall mechanical response is not known.

Method: Under suction, stretch of soft tissues in the forearm of human subjects (N=11) was experimentally measured at rest and under venous occlusion. Three dimensional, fibril-reinforced hyperplastic finite element (FE) model was constructed, the model response was matched with the experimental measurement and mechanical characteristics of each tissue were derived. Parametric analyses were conducted to evaluate the impact of different tissues on the total stretch.

Results: The model suggested that, at large strains, the stretch response was more sensitive to changes in the elastic modulus of skin than those in adipose tissue. During venous occlusion, reduction of the stretch of forearm tissues was related to stiffening of the skin and adipose tissue, as evidenced by increased modulus of 27 ± 21 % and 35 ± 26 %, respectively.

Conclusion: The method based on suction may be used to diagnose and monitor skin changes in properties of soft tissues, especially those of skin, as well as tissue swelling typical to pathological condition such as edema.



CONFERENCE PRESENTATIONS & CASE STUDIES

Preparatory methods in occupational therapy for chemotherapy-induced peripheral neuropathy (CIPN): A case study

Harris, A. 2020. Belmont University, OTD Capstone Projects. <https://repository.belmont.edu/otdcapstoneprojects/27/>

Abstract: Invasive breast cancer affects an estimated 268,600 women per year. However, the mortality rate for breast cancer has declined and the approximate number of deaths from is less than one-third of new cases. Along with the heightened chance of survival, there is also an increase in the side-effects of aggressive treatment options. The treatments such as surgery, chemotherapy, and radiation therapy may be curative but provide occupational limitations of their own. Chemotherapy-induced peripheral neuropathy (CIPN) is a debilitating, long-lasting side effect of many chemotherapy regimens. CIPN is estimated to affect 10-80% of patients and may last over six years following the conclusion of treatment.

This case study highlights the treatment of a 64-year-old female who developed CIPN throughout the treatment of breast cancer. The client reported symptoms of CIPN during follow-up for lymphedema maintenance with the occupational therapist. The client agreed to complete a trial using LymphaTouch™ to decrease symptoms of CIPN. She completed six sessions, each lasting 25 minutes in duration. Objectively, the client demonstrated increased two-point discrimination, vibratory sensation, strength, and increased sensation in portions of her hands and feet. However, portions of her feet decreased in sensation, her balance remained in a normal range, and while overall, her strength increased, it was still below the norm for her age range. The client subjectively reported increased ability to complete meaningful tasks, decreased impact of CIPN, and no disability regarding ADL's. While the objective measures had mixed results, the client's self-perception about the impact of CIPN on her ability to complete desired tasks suggest increased self-efficacy and quality of life.

Preparatory methods in occupational therapy for radiation-induced fibrosis (RF): A case study

Harris, A. 2020. Belmont University, OTD Capstone Projects. <https://repository.belmont.edu/otdcapstoneprojects/27/>

Abstract: Invasive breast cancer affects an estimated 268,600 women per year. However, the mortality rate for breast cancer has declined and the approximate number of deaths from breast cancer is less than one-third of new cases. Despite the increased chance of survival, there is also an increase in the side-effects of aggressive treatment options. The treatments such as surgery, chemotherapy, and radiation therapy can be curative but provide occupational limitations of their own. Mild-to-moderate radiation-induced fibrosis syndrome (RF/RFS) affects 43-58% of patients who receive radiation therapy for breast cancer. RFS is a long-term progressive side-effect of radiation therapy with limited treatment options.

This case study aims to use LymphaTouch™ as a preparatory method in occupational therapy treatment to decrease the effects of RF. By addressing these debilitating effects of RF, the study aims to promote a return to meaningful tasks. The client was found to have deficits in strength, range of motion, skin mobility, satisfaction with breasts, and physical well-being. The client reported decreased quality of life in relation to her RF. The client completed eight sessions of treatment using LymphaTouch™. Following the intervention, the client was found to have increased skin elasticity in 14 out of 16



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segments assessed on her right breast as well as strength and range of motion within functional limits. Despite objective changes, the client reported decreased physical well-being and continued to report no satisfaction with breasts. The objective benefits may provide for a more successful outcome of the surgery due to an increase in skin elasticity and mobility. This case study demonstrates promising results in addressing RF using the LymphaTouch™ device. Further development of a standardized protocol and testing is warranted.

Treatment of Breast Cancer-Related Lymphedema with a Negative Pressure Device: A Pilot Randomized Controlled Study

Lampinen, R., Leano, J., Smoot, B., Mastick, J., Miaskowski, C., Brinker, L. & Lee, J. Q. 2020. APTA Combined Sections Meeting, Denver.

Purpose/Hypothesis: 1 in 5 women develop lymphedema (LE) following breast cancer (BC) treatment. If untreated, LE may become chronic and result in persistent swelling, inflammation, skin thickening, and abnormal fibro-adipose tissue deposition. Current conservative treatments do not specifically address secondary soft tissue changes that may limit response to treatment. The purpose of this pilot randomized controlled trial (RCT) is to evaluate efficacy of treatment for chronic LE using a negative-pressure device, which mobilizes skin and subcutaneous tissue to support lymphatic circulation.

Subjects: Data were analyzed for 28 women (informed consent provided) who were >1 year post active BC treatment and have had unilateral upper extremity LE for >1 year. Women were randomized into the negative-pressure device treatment group (n=14) or the manual lymphatic drainage (MLD) control group (n=14).

Material/methods: This study compared negative-pressure massage using the LymphaTouch device (Helsinki, Finland) to MLD. Both groups used the Vodder unilateral upper extremity LE sequence. All participants received twelve 1-hour treatments over 4 to 6 weeks. Patients completed demographic and clinical questionnaires, and the Disability of Arm, Shoulder, Hand (DASH). Objective measures included bioimpedance (L-Dex; Impedimed) and limb volume (ml) calculated from limb circumference. T-tests and ANOVA (General Linear Model–Repeated Measures) were used to evaluate within and between-group differences and interaction effects.

Results: Average age was 62.4 years (SD 12.3) and BMI was 29.0 (SD 9.6). Mean baseline interlimb volume difference (affected vs unaffected limbs) was 511.3 ml (SD 378.2) and L-Dex was 29.0 (SD 23.3). Differences between groups at baseline were not statistically significant for age ($p=0.108$), BMI ($p=0.802$), L-Dex ($p=0.218$), DASH ($p=0.259$) and interlimb volume difference ($p=0.076$). The LymphaTouch group demonstrated slightly greater improvement in L-Dex, volume, and DASH scores, compared to the MLD group. However, only the between-groups difference in the change in L-Dex reached statistical significance, favoring the LymphaTouch group (L-Dex change: MLD mean +2.79 L-DEX units, SD 5.08); LymphaTouch: mean -4.16 L-Dex units, SD 7.51; interaction $p=0.008$).

Conclusions: Treatment with the negative-pressure massage device resulted in statistically significantly greater improvement in L-Dex scores compared to MLD, in women with unilateral upper extremity LE of >1-year duration. Slightly, but not statistically significantly greater improvements were also observed in volume and self-reported function. Three adverse events were recorded during the study but all were deemed unrelated to the treatment.

Clinical Relevance: Further research is needed to identify effective treatments for chronic LE that addresses not only limb volume but also secondary soft tissue changes. This can improve our ability to offer targeted interventions and improve outcomes for patients impacted by breast cancer-related LE. Results from this pilot study will guide the development of a larger, hypothesis driven RCT.

English translation:

Efficient peri-operative and post-operative decongestive instrument-based negative pressure treatment and mechanical vibration for anti-oedematous swelling treatment of a trauma and orthopaedic patient at the lower extremity - A quality study

Dresing, K., Fischer, A.-C., Spering, C. & Saul, D. 2019. Deutscher Kongress für Orthopädie und Unfallchirurgie (DKOU 2019). Berlin, 22.-25.10.2019. Düsseldorf: German Medical Science GMS Publishing House. DocAB32-1248

Queries: In case of traumatic or post-operative oedemas, it deals with the limited transport capacity (missing muscle pump, destruction of lymphatic channels) for congestion. Consequences of oedema are e.g. change in shape, pain, limited functionality, higher infection and wound disorders. Manual lymph drainage (MLD) is an important treatment with respect to the complex physical decongestion (CPD). MLD activates the lymph drainage and reduces the postoperative complications.

Objective of the study: Evaluation whether an instrument-based negative pressure lymph drainage (NPLD) can reduce peri-operative swelling at the lower extremity effectively and sustainably.

Methodology: Prospective study submitted to the Ethics Commission. The negative pressure was applied locally with the Lymphatouch®(LT) (FDA permitted) using a silicone-coated applicator. Treatment can be done in a local stationary manner or by using the "Lift + Twist" - technique. Pressure between 20-250mm HG was applied depending on the skin and tissue texture. The frequency was chosen between 90-70 Hz. Type of application: pulsed or continuous negative pressure treatment combined with high-frequency vibration. The process is always started in the supraclavicular fossa area, continued till the OP area at the upper or lower extremities, duration approx. 30 min. The patient was encouraged to drink fluids after the LymphaTouch treatment (LTT). The actions have been taken after the clarification, documentation of the findings (measurement, photo).

Inclusion criteria: Patient (P) with injury at the lower extremity (E), elective P, age > 18 years, consent

Girth measurement, movement according to NNO, Statistics: Multi-variance, Wilcoxon test not parametric

Results: 101 P with injuries/operations at the lower extremity, MW 3.6± LTT. The swelling was more pronounced at the knee. After 4 treatments, there was a measurable decrease in swelling of 11.6% at the lower extremity. For P with hip traumas/ops, the swelling at the femur reduced by 8.6% between LTT 1 vs. 5. Knee trauma/Ops: Gender differences of the swelling were significantly more in case of women. The mobility improved objectively, the pain decreased. The patients reported subjective immediate relief, complications were not documented.

Conclusion: The perioperative and post-traumatic swelling states at the lower extremity can be sustainably and positively affected with the LT-NPLD. The pre-operative duration up to the planned operation can, likewise, be reduced like the post-operative phase. Thanks to the decrease in swelling, the patient can be operated earlier, discharged earlier and needs less analgesics.

Abstract translated from original German version **Effiziente peri- und postoperative dekongestive apparative Unterdruckbehandlung und mechanische Vibration zur antiödematösen Schwellungsbehandlung von Unfall- und Orthopädischen Patienten an der unteren Extremität – eine Qualitätssicherungsstudie**



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English translation:

Effective peri-operative and post-operative decongestive instrument-based negative pressure treatment and mechanical vibration for anti-oedematous swelling treatment of a trauma and orthopaedic patient at the upper extremity - A quality study

Dresing, K., Fischer, A.-C., Spering, C. & Saul, D. 2019. Deutscher Kongress für Orthopädie und Unfallchirurgie (DKOU 2019). Berlin, 22.-25.10.2019. Düsseldorf: German Medical Science GMS Publishing House. DocAB77-1230

Queries: In case of traumatic or post-operative oedemas, it deals with the limited transport capacity (missing muscle pump, destruction of lymphatic channels) for congestion. Consequences of oedema are e.g. change in shape, pain, limited functionality, higher infection and wound disorders. Manual lymph drainage (MLD) is an important treatment with respect to the complex physical decongestion (CPD). MLD activates the lymph drainage and reduces the post operative complications.

Objective of the study: Evaluation whether an instrument-based negative-pressure lymph drainage (NPLD) can reduce peri-operative swelling effectively.

Methodology: Prospective study submitted to the Ethics Commission. The negative pressure was applied locally with the Lymphatouch®(LT) (FDA permitted) using a silicone-coated applicator. Treatment can be done in a local stationary manner or by using the "Lift + Twist" - technique. Pressure between 20-250mm HG was applied depending on the skin and tissue texture. The frequency was chosen between 90-70 Hz. Type of application: pulsed or continuous negative pressure treatment combined with high-frequency vibration. The process is always started in the supraclavicular fossa area, continued till the OP area at the upper extremities, duration approx. 30 min. The patient was encouraged to drink fluids after the LymphaTouch treatment (LT). The actions have been taken after the clarification, documentation of the findings (measurement, photo).

Inclusion criteria: Patient (P) with injury at the upper extremity, elective P, age > 18 years, consent

Girth measurement, movement according to NNO, Statistics: Multi-variance, Wilcoxon test not parametric

Results: 45 P upper extremity, 3,5±1 NPLD. The swelling was more pronounced at the elbows in case of shoulder and upper arm injuries. The difference in swelling between younger and older patients (oP) was significantly less favorable for oP at the upper extremity. After 4 treatments, there was a measurable decrease in swelling of 19.9% at the UE. The reduction 15 cm prox. + direct at the elbow was significantly the best in the T-test as well as the hand mobility.

Conclusion: The perioperative and post-traumatic swelling states at the upper extremity can be sustainably and positively affected with the LT-NPLD. The pre-operative duration up to the planned operation can, likewise, be reduced like the post-operative phase. Thanks to the decrease in swelling, the patient can be operated earlier, discharged earlier and needs less analgesics.

Abstract translated from original German version **Effektive peri- und postoperative dekongestive apparative Unterdruckbehandlung und mechanische Vibration zur antiödematösen Schwellungsbehandlung von Unfall- und Orthopädischen Patienten an der oberen Extremität – eine Qualitätssicherungsstudie**



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The effect of LymphaTouch® vs. a sham treatment on immediate pain and range of motion in acute low back pain

Greenstein, J., Etnoyer-Slaski, J., Huffman, A. & Behm, D. 2019. The 21st Annual Performance Health Scientific Advisory Committee (TRAC) Research Meeting.

Background: Low back pain is the number one global burden, affecting 80% of people in the US at some point in their life. The LymphaTouch® is a medical treatment device which uses the effects of negative pressure in tissues for pain and swelling. It has been shown to improve pain 63.9%, with an average 3.5 decrease in pain scores in back and hip patients.

Purpose: The purpose of this study is to determine the effect of LymphaTouch® versus a sham treatment on pain and range of motion in individuals with acute low back pain

Design: Single-blind randomized clinical trial

Methods: A convenience sample of forty acute low back pain patients were recruited from an outpatient chiropractic clinic at their initial appointment. Participants were 18 years or older and diagnosed with acute low back pain. Exclusionary criteria \ included less than 18 years of age, pregnancy, cancer, a corticosteroid injection within the past 2 weeks, previous back surgery, acute deep vein thrombosis, acute infection, congestive heart failure, cardiac edema, kidney dysfunction, and any conditions in which increased venous and lymphatic return is undesirable. Eligible patients who agreed to participate in the study completed the informed consent, demographics information questionnaire (including pain medication usage), rated their overall pain on the Numeric Pain Rating Scale (NPRS), the Oswestry Disability Index (ODI), and the Functional Rating Index (FRI) [T0]. Following the doctor's evaluation, range of motion (ROM) was assessed using a digital goniometer and pain rated during each motion. Participants were then randomized into either the LymphaTouch® group [A] (n=30) or sham treatment group [B] (n=30). The participants were blind to which group they were assigned. Following the group selection, each participant received their assigned intervention. After the respective intervention, both groups immediately rated their overall pain and repeated the ROM tests [T1]. Then, all participants completed a satisfaction questionnaire about the intervention they received.

Statistical Analysis: Statistical analyses were completed using the SPSS software (Version 26.0, SPSS, Inc. Chicago, IL). First, Mauchly's test of sphericity was conducted for all dependent variables. If the assumption of sphericity was violated, the Greenhouse-Geisser correction was employed. A mixed model repeated measures 2-way ANOVA (2 groups x 2 times) was used to analyze the data. Paired t-tests with Holm-Bonferroni corrections were used to decompose significant interactions, and Bonferroni post hoc tests were used if main effects were found. Significance was set at $p \leq 0.05$. For significant main effects and interactions, eta (proportion of variance associated with one or more main effects, or interactions) and observed power (statistical power of the test based on the effect size indicating the probability of finding a statistical difference) were calculated. Eta values represent; small (0.01), medium (0.06), and large (0.13) effects. Cohen's d effect sizes (ES) were also calculated for significant specific interactions. Effect size (d) magnitude of change were calculated for interactions and reported as trivial (<0.2), small (0.2-0.49), medium (0.5-0.79) or large (≥ 0.8) effect sizes (d) (Cohen 1988). Data is reported as mean \pm SD.

Results/Conclusion: A total of 41 participants enrolled in the study with 38 having completed the study, 20 in the LymphaTouch® group (7M, 13F) and 18 in the sham treatment (11M, 7F). There was no significant between group effects ($p=0.26$) for pain, however there was a main effect for time ($p<0.0001$, eta: 0.34, Observed Power: 0.988) with a 10.04% ($d=0.34$) decrease from baseline (7.071.9) to post-treatment (6.362.15). A significant time x group interaction ($p=0.001$, eta: 0.27, Observed Power: 0.945) demonstrated a 18.5% ($d=0.59$) pain reduction with LymphaTouch® Group from baseline (7.02.03) to post-treatment (5.72.3). There was no significant ($p=0.16$) change over time for the Sham Group. For trunk flexion ROM, there was no significant between group effects

($p=0.08$). A main effect for time ($p<0.0001$, $\eta^2: 0.53$, Observed Power: 1.00) revealed a 22.3 ($d=0.47$) improvement in trunk flexion ROM (baseline: 23.610.6 vs. post-treatment: 28.811.3). In addition, a significant ($p<0.0001$, $\eta^2: 0.47$, Observed Power: 1.00) time X group interaction indicated 37.5% ($d=0.83$) ROM increase for LymphaTouch® Group ($p<0.0001$) from baseline (24.511.6o) to post-treatment (33.710.6o), but no significant change for the Sham Group ($p=0.33$). There were no significant main effects or interactions for trunk flexion pain and hip flexion ROM or pain.

Clinical Relevance: The LymphaTouch® significantly reduced their pain from pre- to immediate post-treatment, while the sham group had no reduction in pain. Additionally, the LymphaTouch® group significantly improved Trunk Flexion ROM pre- and post-treatment. These results advocate the use of a negative pressure machine, like the LymphaTouch®, to immediately improve pain and trunk ROM in an acute low back pain population. Future research should investigate the long-term effects of the device on acute and chronic low back pain.

Graded Negative Pressure: Does It Have A Place In The CDT Treatment Model?

Donahue, P. & Donahue, M. J. 2019. 9th Conference of the International Lymphoedema Framework

Objective: To test the hypothesis that mobilization of protein-enriched hardened tissue using graded negative pressure therapy in conjunction with CDT will improve patient-valued functional outcomes compared to CDT alone.

Methods: Six patients with advanced secondary arm or leg lymphedema received sequential CDT with and without graded negative pressure therapy. Therapy was provided by the same trained lymphedema physical therapist. Patient Specific Functional Scale (PSFS) outcome measure was evaluated pre and post the course of treatments.

Results: Patients improved with both conservative therapies. PSFS scores support all six patients' expressed thoughts of greater improvement when graded negative pressure was utilized in their care. They felt tissue softer, lymphedema easier to manage and limb feeling lighter with less pain.

Conclusion: In this pilot study, the inclusion of graded negative pressure therapy with CDT provided further improvements in patient valued outcomes than CDT alone. Further investigation is needed to evaluate quantitative and qualitative treatment impact on these two conservative therapies.

Significant Improvement In Quality Of Life After Treatment Of Lower Extremity Lymphedema With Negative Pressure Application

Mackenzie, A. & Donahue, P. 2019. 26th World Congress of Lymphology. September 2017.

Abstract: The patient case presented was conducted to assess if CDT combined with PhysioTouch has a patient-valued- impact on the patient's expressed pain & quality of life. A 55-year-old female diagnosed with secondary Stage III lower limb lymphedema. She received ten weekly treatments of MLD combined with PhysioTouch treatment, one session lasted 60 minutes. Pain was assessed using the VAS scale, volumetric measurements obtained via perometry, clinical assessment of skin and superficial tissue mobility via palpation, QOL measures: Patient Specific Functional Scale (PSFS) & Lower Extremity Functional Scale (LEFS).

The conclusion was that QOL and pain improved which patient reported and compared to previous courses if CDT treatments. The results indicate that; Pain improved: VAS reduced from 4/10 to 1 /10, PSFS improved by four points, LEFS improved by eleven points.

The Effects of a Hand-Held Negative Pressure Lymph Drainage (NPLD) Device on 2 Primary Lymphoedema Patients of Different Durations

Whitaker, J. 2018. 8th International Lymphoedema Framework Conference. 6-9 June 2018, Rotterdam, Netherlands.

Description: Lymphoedema can be either Primary or Secondary in origin. How the tissues respond to different treatment modalities when subjected to the same intervention maybe due to the underlying nature of the tissue and fibrotic changes.

Reason for report: Lymph drainage has historically and predominately done using the therapists hands following lymphatic pathways. Technology has improved and developed and this can now be done using a hand-held negative pressure device*. This was used to perform lymphatic drainage on two Primary lymphoedema patients.

Case description: Two patients with primary lymphoedema, who attend clinic to have lymph drainage specifically with this device agreed to their results presented. Patient (A) age 65 and patient (B) age 23, had limb volume measurements taken using the 4cm tape measure method pre-lymph drainage. NPLD was performed using the same sequence for one hour on each patient. Post-limb volume measurements were repeated and recorded.

Discussion: Patient (A) reduced her limb volume by 198mls. Patient (B) reduced her limb volume by 690mls.

Both patients achieved a good result. It is likely that the duration of lymphoedema (8 years) caused patient B to have a greater reduction over patient A (50 years). The stages of lymphoedema (ISL, 2013) indicate from examination that patient A was late stage 3 and patient B was stage 2.

Negative Pressure Therapy as Adjunct Treatment for Patients with Facial Palsy

Barth, J., Chua, C., Stezar, G., Ahmed, Z. & Bokhari, S. 2017. Facial Nerve Symposium.

Introduction: Physical therapists perform 3D manipulation with negative pressure therapy devices to stretch and loosen tissues that have thickened and caused a decrease in circulation and adhesion to surrounding tissues. This technique has been applied to patients with a variety of diagnoses.

Objective: To assess the use of negative therapy devices on patients exhibiting facial palsy.

Methods: Four patients were evaluated for facial tightness and treated using a negative pressure therapy device. Patients were scored according to the Sunnybrook Facial Grading System (FGS) before and after the introduction of negative pressure therapy, on average, every three weeks.

Results: Before negative pressure therapy, when patients underwent standard treatment, including manual therapy and neuromuscular reeducation, on average, voluntary movement increased by 5 points, resting symmetry improved by 1.5 points, synkinesis did not change, and composite score increased to 6.25 points. When negative pressure therapy was introduced, on average, voluntary movement increased by 4 points, resting symmetry improved to 2.5 points, synkinesis did not change, and composite score increased to 6.5 points.

Conclusions: Although there was no statistically significant increase in composite score, all patients reported decreased discomfort and facial tightness, as well as overall progress. Further investigation is recommended to determine the long-term benefits of negative pressure therapy for facial palsy patients.

Treatment Of The Periwound With Intermittent Negative Pressure

Briggs J. & McKennedy K. 2016. *Symposium of Advanced Wound Care Spring. April 5th-9th 2017. San Diego, USA.*

Abstract: This whitepaper includes two patient cases presenting negative pressure as an approach in treatment of the periwound. Each patient received standard wound care including a weekly physical therapy visit with pulsed lavage and debridement and weekly occupational therapy visits with use of manual lymphatic drainage, using intermittent negative pressure device and compression. Special wound dressings were also applied.

The intermittent pressure device was applied to the medial knee and down the lymphatic tracts opening the tracts towards the wound bed. The device was applied around the wound bed on various settings depending on the amount of fibrosis, skin condition and patient sensations. This included altering settings between 80-250 mmHg, duration of pulse 0.5-4 seconds. Vibration was also applied in most fibrotic areas at 20 Hz. The settings were adjusted to the patient tolerance to avoid pain or damage to the skin.

Once the area around the wound bed was treated, the device was applied along the lymphatic channels from the wound bed toward the medial knee, where MLD was also applied distal to proximal to the inguinal lymph nodes.

Patient 1 demonstrated resolution of stagnant wound measurements following two sessions. Patient 2 demonstrated a 37% reduction in wound measurements following three treatments, a 35% reduction after additional four treatments and a 90% reduction to near wound closure after the final three treatments.

This limited case study shows potential for additional treatment options to manage swelling during the wound healing phases, which include treatment of the periwound and lymphatic system.

Can Early Intervention with PhysioTouch®'s Mechanical Leverage in the Functioning of Initial Lymphatic Vessels Help Promote Long Term Physiological Homeostasis as Well as Fluid Volume Reduction in a Locally Impacted Lymphatic Territory

Osborne, J. 2015. *25th World Congress on Lymphology. September 7th-11th 2015. San Francisco, USA.*

Abstract: Case study that investigates how adding PhysioTouch to lymphedema patient treatment affects fluid reduction. Both circumferential volume and L-Dex BioImpedance measurements were taken. PhysioTouch was shown to create greater radial tension through to anchoring filaments to initial lymphatics (IL) than lymphatic manual drainage, thereby increasing fluid movement from the interstitium into the ILs.

Patient was diagnosed with breast cancer in 2012 and underwent mastectomy and expander placement, followed by external beam radiation therapy. At six months, expanders were replaced with implants. HR had immediate severe infection (R) implant. Implant was removed within 48 hours. IV antibiotics were administered. Two open chest incisions were surgically made to drain fluid. Drainage wounds drained for eight months. (R) UE developed Stage 2 lymphedema at onset of infection. CDT was initiated, but with minimally successful results. In 2014 Lymphoscintigraphy results revealed total obstruction of flow through axillary lymph nodes. In August 2014 HR underwent DIEP Flap surgery with Lymph Node Transfer of four nodes from abdomen to (R) axilla. Initial results of decreased (R) UE circumferential lymph volume measurements were positive. At six months post-surgery, circumferential volume reduction plateaued.

PhysioTouch was introduced into the treatment plan in January 2015. The specific

effectiveness of PhysioTouch is its increased strength, greater than that of LMD (lymphatic manual drainage), in creating radial tension through the anchoring filaments of the ILs, thereby increasing fluid movement from the Interstitium into the ILs. This success in treatment can be objectively measured by both circumferential volume using a tape measure and L-Dex BioImpedance, the latter giving a more accurate clinical picture of relative fluid volume in a limb. Based on L-Dex BioImpedance measurement, PhysioTouch introduction to the treatment plan resulted to nearly 50% reduction in the arm volume in six months.

A Clinical Audit to Demonstrate the Use of a Negative Pressure Device in an MLD Sequence to Improve Both Clinical and Patient Perception Treatment Outcomes

Whitaker, J. C. 2015. 25th World Congress on Lymphology. September 7th-11th 2015. San Francisco, USA.

Abstract: Case study that investigates how PhysioTouch in conjunction with Manual Lymphatic Drainage improves lymphatic drainage compared to RCT Bandage studies. The case showed that PhysioTouch with MLD achieved in just four days comparable change in excess limb volume being than RCT Bandage studies performed over 19 days. (Badger et al, 2000).

65-year-old lady with unilateral Primary Lymphedema. PhysioTouch was used on four consecutive days to perform the Casley-Smith MLD method. The lady completed a simple patient self-reported rating scale questionnaire on skin, tissue, visual improvement and range of movement. Limb volumes were recorded using the 4cm tape-measure technique

The change in excess limb volume was 39% and absolute limb volume was 5%. The patient's self-valuation showed improvement in all areas questioned and comments noted were very positive.

Overall the treatment outcomes measured showed favorable results with the change in excess limb volume being comparable to RCT Bandage studies performed over 19 days. (Badger et al, 2000). Tissues were notably softer and visually reduced in size. Range of movement and fit of clothing from a patient's perspective were also improved. PhysioTouch was found to improve both clinical and patient perceived treatment outcomes.

The Benefit of One Session on a Negative Pressure Device When Used in a Manual Lymphatic Drainage (MLD) Sequence in Primary Lymphoedema

Whitaker, J. C. 2015. 25th World Congress on Lymphology. September 7th-11th 2015. San Francisco, USA.

Abstract: Case study that investigates how PhysioTouch in conjunction with Manual Lymphatic Drainage improves lymphatic drainage for primary lymphedema patient. After one-hour treatment, 19% of lost lymphedema was recorded using 4cm tape-measure technique. Also, based on subjective observation tissues were softer and shape improved.

A 65-year-old lady with unilateral Primary Lymphedema - stage IIb, was given a one-hour MLD session using the Casley-Smith technique with a NPD. The NPD was set at 80mmHg. Limb volume measurements using the 4cm tape-measure technique were taken and volumes were recorded in milliliters. Measurements were taken immediately before and directly after the treatment.

Actual changes in excess limb volume was measured at 198ml, which indicated that 19% of the lymphedema had been lost in only one hour. Case study concluded that introducing PhysioTouch to MLD substantially reduces the change in limb volume after just one session. Also, the patient rated the treatment very favorably and requested the continuation of future treatments with this device.

A New Vacuum Suction Device For Management Of Lymphedema

Vuorinen, V.-P. & Airaksinen, O. 2009. 22nd International Congress of Lymphology, Program & Abstract book pp. 121. September 21st-25th 2009. Sydney, Australia.

Introduction: Lymphedema of the extremities is a general problem for many medical conditions (post-operative, post-traumatic and after radiotherapy). Manual lymphatic drainage, intermittent pneumatic compression treatment and compression garments are used generally for management of the edema of extremities. However, the efficacy of these therapies has not been established, and depends a lot on the expertise of the caregiver. Aim of this paper is to present a new vacuum suction device for assisting in the therapy of lymphedema.

Methods: According to literature, increasing negative pressure of lymph capillaries, and stimulation of lymphangiomotoricity via deformation of tissues increases the lymph flow and lymph drainage. Based on this theoretical foundation, a new vacuum suction device called LymphaTouch® (HLD Healthy Life Devices Ltd, Helsinki, Finland) was developed. The device consists of a main unit and different sized treatment heads. The main unit is computer controlled which enables constant or pulsating treatment modes and measurement of changes in skin elasticity. With these properties the therapy can be optimized. Controlling the treatment intensity based on the tissue response is also possible.

Conclusion: During classical lymphatic drainage therapy it is difficult to control the compression and suction phase. By using this new device, the pressure conditions in the tissue will be controlled exactly. Also, the therapist induced variability will be reduced. All these facts will influence the quality of treatment. Well controlled clinical trials will be needed to document these theoretical facts.

Management Of Post-Mastectomy Lymphoedema By Novel Vacuum Suction Device, A Case Report

Vuorinen, V.-P. & Airaksinen O. 2009. 22nd International Congress of Lymphology, Program & Abstract book. pp. 118. September 21st-25th 2009. Sydney, Australia.

Abstract: Case study was performed on a 56-year-old female who had overcome mastectomy with lymph node evacuation. In 2002, lymphedema started to develop in patient's right arm and had progressed to stage 2. The patient has received CDT annually and wears a compression sleeve.

The patient was treated with LymphaTouch. The manual part of CDT was replaced by therapy given with the LymphaTouch device, except for the handling of lymph nodes which was done manually. The patient received a series of ten treatments lasting one hour each. Arm circumference was measured before and after treatments. Whole body tissue composition was measured by InBody® 720. InBody measurement showed 185 ml reduction in the edematous arm and whole-body fluid decreased by 900 ml (3%). Based on circumference measurement, edema reduced by 3%. The patient graded the treatment as pleasant.



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RESEARCH REPORTS

LymphaTouch And PhysioTouch Treatment As A Part Of Active Physiotherapy: Effect On Pain And Swelling

Hietanen, S., Puustinen, T., Jouhki, I., Palomäki, K. & Taskinen, T. 2014. Internal report.

Abstract: The target of this study was to chart the effectiveness of LymphaTouch® and PhysioTouch® as part of active and conservative physiotherapy. The study focused on examining the change in pain during the treatment period and in the change in swelling. In addition, the need for pain medication and the change in the need for pain medication was defined.

As a basis for the study, preliminary research carried out in 2010 was used. The results of this previous study showed that it was justified to expand the study to this second phase. A total of 37 rehabilitation and physiotherapy professionals participated in the study in Finland. Altogether 202 patient cases were reported from different treatment areas with upper groups of leg, arm, mid-body, and the neck and shoulder area which were then divided in more detail into subgroups based on symptoms. The treatment periods and treatment session durations of the patients varied according to the real treatments.

The results have been reported from situations corresponding to heterogeneous and actual treatment situations. The changes in the VAS scale was the factor studied with the most detail in this study. The result was that the VAS change in all the patients groups was significant; 30%. The individual patient experiences of using PhysioTouch and LymphaTouch as part of the treatment course were primarily positive.

Influence Of LymphaTouch-Treatment Method For Pain And Edema In Context Of Active Physiotherapy

Airaksinen, O., Vuorinen, V.-P. & Raittila, S. 2011 Internal Research Report.

Abstract: A pilot study that concentrates on analyzing how LymphaTouch treatment influences pain and edema in conjunction with active physiotherapy. Total of 18 patients were analyzed. For some patients over 50% pain reduction was recorded.

The purpose of this study was to investigate how the introduction of a 20-minute LymphaTouch treatment to a standard active therapy session changes edema and pain. Pain was recorded with the standard VAS scale and edema with measurement bands, by palpation, and by visual observation. The study included 18 patients with neck-shoulder, knee, wrist, and elbow pain. Three wrist patients were excluded from data as their therapy did not include LymphaTouch treatment. Each patient had a doctor's referral for active physiotherapy.

Research data from a total of 66 therapy sessions were analyzed for all the indications. Research showed that already 20-minute use of LymphaTouch was effective and for some patients even 50% pain reduction was recorded.

Effect Of PhysioTouch Treatment On Perception Of Doms And Recovery After Heavy Resistance Exercise

Nummela, A. & Mikkola, J. 2013. Research Institute for Olympic Sports -KIHU, Jyväskylä. Vuorinen, V.-P., Iivarinen, J., Jurvelin, J. & Airaksinen, O. 2013.

Background: Delayed muscle soreness (DOMS) is a familiar experience for the athletes. A number of treatment strategies have been introduced to help alleviate the severity of DOMS and to speed up the recovery of the muscles, but still exercise is most effective means of

alleviating pain during DOMS. The present study was planned to investigate where the PhysioTouch treatment alleviates the severity of DOMS, speeds-up the elimination of muscle trauma and inflammatory markers and speeds-up the recovery of force production after heavy resistance exercise in recreational athletes.

Methods: A group of 14 recreational strength athletes performed 5 x 10 repeated maximum squat twice: with or without the PhysioTouch treatment (PTT and NOT, respectively) during four days of recovery. The maximal force production was measured with isometric leg press test and countermovement jump before and after the squat exercise and during four days of recovery. Furthermore, muscle trauma and inflammatory markers were measured before and after the squat exercise and four days during the recovery. The blood markers were leukocytes, CK, LDH, Mb, CRP and cortisol. Subjective perception of DOMS was rated on a visual analog scale from 0 to 100 mm.

Results: Maximal isometric force and the height of countermovement jump decreased significantly ($P < 0.001$) but no significant difference was observed between NOT and PPT. Subjective perception of DOMS increased significantly after the squat exercise ($P < 0.001$) and reached the highest value two days after exercise. DOMS was significantly lower in PTT than not three days after squat exercise ($P < 0.05$). All blood markers except CRP increased significantly during squat exercise but there were no significant differences between PTT and NOT ($P < 0.05$).

Conclusion: The result of this study indicate that PTT decreased the perception of DOMS after a strenuous squat exercise in recreational strength athletes. However, PTT did not speed up the elimination of muscle trauma markers after squat exercise and PTT did not influence on the recovery of force production in athletes who were to strength training.

Lymphatic Therapy Using Negative Pressure, A Clinical Study With The LymphaTouch Device

Vuorinen, V.-P., Iivarinen, J., Jurvelin, J. & Airaksinen, O. 2013. Research Report #5320003/221, Finnish Funding Agency for Technology and Innovation, August 2013.

Abstract: A clinical study comparing lymphatic therapy administered on breast cancer lymphedema patients with a negative pressure device to manual lymph drainage (MLD) therapy. Aim was also to verify the physiological effects of LymphaTouch therapy in swollen tissue and to establish the safety of lymphatic therapy administered with the LymphaTouch device. Research showed that LymphaTouch reduced over 3x more limb volume than MLD. Also, patient degree of disability (DASH) reduced by 30% and Quality of Life (FACT-B) improved by 14%.

The study consisted of 13 female patients, seven treated with LymphaTouch and six with MLD (Vodder method). Each patient had undergone mastectomy involving removal of the axillary lymph nodes, and been diagnosed with lymphedema of an upper extremity as a result. Both patient groups were treated 10 times by the same therapist. Total treatment time was 90 minutes, out of which 60 minutes was used for lymphatic therapy. The treatment also included arm measurements and standard compression bandaging. The only difference between the two groups was the type of lymphatic therapy administered, either MLD or LymphaTouch. The study was funded by European Union.

The results of the treatment were measured using various methods, including volumetric limb measurement, limb circumference, MRI measurement of limb volume, tissue stiffness, and body composition analysis (InBody). Additionally, patient degree of disability was assessed using FACT-B and Quality of Life using DASH questionnaires.

The study results showed significant improvement using LymphaTouch over MLD for both objective and subjective measurements. MRI measurement showed over 3x improvement in limb volume reduction (2% MLD vs. 7% LymphaTouch) and skin stiffness was improved

by over 4x (2% MLD vs. 9% LymphaTouch). Patient's quality of life was improved nearly 3x more for LymphaTouch group of patients (5% MLD vs. 14% LymphaTouch). While MLD showed no change for degree of disability, LymphaTouch group reported over 30% reduction (0% MLD vs. 30% LymphaTouch).



DEGREE THESES

Effect of LymphaTouch Treatment on Pain, Swelling and Range of Motion in the Acute Phase of Ankle Ligament Injury

Kaipainen, A. & Ravaska, I. 2020. Thesis for Degree Programme in Physiotherapy, Bachelor of Healthcare. Lapland University of Applied Sciences.

Abstract: The purpose of this thesis was to test the effects of LymphaTouch® treatment on the acute phase symptoms of secondary or tertiary ankle ligament injury, i.e. pain, swelling and the limited mobility of the joint. The aim was to provide LymphaTouch Inc with information on one case of how LymphaTouch treatment affects the symptoms of the acute phase of the ankle ligament injury. From the customer perspective, the aim was to intensify rehabilitation so the customer could return to her sport as quickly as possible. In addition, the aim was to bring more information to the entire physiotherapy field about one health technology device and to give physiotherapists information about LymphaTouch® treatment. The aim was also to improve our own skills needed in the research process and our own professional expertise in physiotherapy.

The research was carried out as a case study and the results were collected and presented by means of quantitative research. Target person for the case study was found by mapping sport clubs and organisations in Rovaniemi. When the target person who met the study criteria was found, a two-week intervention period was started, in which LymphaTouch® treatments were conducted every three days. Same measurements were done every treatment time, before and after. After the intervention period, research results were analyzed by reviewing research results of one treatment time and of the whole intervention period. In the analysis the individual variables were under review. The results were presented in the form of diagrams and tables.

Based on the results of the study, in this case LymphaTouch® treatment could reduce swelling and increase range of motion in the ankle ligament injury in every treatment time. There was no consistent evidence of pain in a one singular treatment session. However, when looking at the whole intervention period, the pain decreased significantly

The Effects of LymphaTouch Treatment Method After Ankle Sprain

Mäkinen, L. & Kosonen, S. 2019. Thesis for Degree Programme in Podiatry, Metropolia University of Applied Sciences.

Abstract: The purpose of this thesis was to provide a protocol for the use of the LymphaTouch treatment method in the aftercare of a sprained ankle for a case study. Another purpose was to consider other possible uses of the device in podiatry. The thesis was carried out in cooperation with LymphaTouch, a Finnish healthcare technology company.

Ankle sprain is one of the most common musculoskeletal injury, and we wanted to explore possible new ways to improve its rehabilitation. In our work, we used upper and lower ankle joint mobility and ankle circumference as measurements.

Based on our theoretical knowledge, we designed a protocol to treat ankle sprain and selected appropriate gauges for it.

The Effect Of The LymphaTouch Treatment Method On Recovery After Heavy Hypertrophic Resistance Exercise

Kuronen, S. 2014. B.Sc. Thesis for Degree Programme in Physiotherapy, JAMK University of Applied Sciences.

Abstract: The purpose of this study was to investigate whether LymphaTouch® treatment speeds up the recovery after heavy hypertrophic resistance training with men doing recreational strength training. This thesis was part of the LymphaTouch 2013-project which was implemented in cooperation with the Research Institute of Olympic Sports (KIHU), HLD Healthy Life Devices Oy and the University of Jyväskylä. The aim of the study was to gain reliable research data on the impact of LymphaTouch® treatment. The purpose of this thesis was to determine the impact of the LymphaTouch® treatment and the function of the lymphatic system. In this study, recovery was examined based on the muscle trauma and inflammation markers in the blood samples, force production and subjective recovery sensations. In addition, swelling of the lateral thigh muscle was examined by using ultrasound.

14 recreational athletes completed two research weeks. During one week, they were treated with LymphaTouch® device according to a strict recovery protocol after resistance training for three recovery days. On the fourth recovery day, only recovery measurements were performed. During the other week, the subjects did not receive any treatment. Hence, each subject also had the role of being a control subject and their recovery was compared between two weeks. The order of the weeks was randomized so that seven subjects received treatment on the first research week and remaining seven subjects on the second week.

The results of this study indicated that LymphaTouch® treatment did not speed up the elimination of muscle trauma or inflammation markers. The muscle trauma marker creatinine kinase (CK) was even higher on the third recovery day of the treatment weeks. However, the subject had less delayed muscle soreness (DOMS) and they felt more recovered during the treatment week. The treatment did not influence on the force production, and no explanations could be found for the athletes' personal recovery sensations.

Perceived Recovery Of American Football Players After LymphaTouch Treatment

Hyvönen, H. & Salonen, E. 2013. B.Sc. Thesis for Degree Programme in Podiatry, Metropolia University of Applied Sciences.

Abstract: The aim of this study was to examine if LymphaTouch® treatment method, which activates the superficial lymphatic capillary network, is suitable for the American football players' re-recovery between practices. There was a need for this kind of study because more knowledge about the possibilities of LymphaTouch® treatment method is needed. The cooperation partners in our thesis were HLD Healthy Life Devices Oy, the developers of LymphaTouch® treatment method and Kir-Fix Oy who lent us the LymphaTouch® equipment. In addition, Vantaa TAFT was our cooperation partner and our study sample consisted of eight of the team's players. The treatment period was executed in April and May 2013 and the treatment was given in the team's sport stadium facilities after practices. The suitability of LymphaTouch® treatment method was estimated by players after the treatment: they compared their recovery after LymphaTouch® and without it.

Both quantitative and qualitative methods were used in this study. The material was collected by using questionnaires.



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The results of this study showed that especially experiencing muscle stiffness but also muscle soreness decreased among players after LymphaTouch® treatment compared to recovery without treatment. The treatment did not seem to have any effect on performance. According to most players LymphaTouch® treatment is suitable for enhancing recovery.

The results of this study are quite promising but because of the small study sample the results can't be generalized. These results can be utilized by the users of LymphaTouch®, for example podiatrists, physiotherapists and lymph therapists.

Effect Of Lympha System Activation In Athletes' Recovery

Sanelma, H. 2013. B.Sc. Thesis for Degree Programme in PhysioTherapy, School of Healthcare, Rovaniemi University of Applied Sciences.

The aim of this study was to gather information of the positive effects of using lymphatic system activation for athletes recovery from daily training. Test subjects were athletes from Finnish junior and A- national team of Nordic combined. The activation of lymphatic system was done with LymphaTouch® device using recovery treatment protocol. The results of this study are based on subjective experience of test subjects. Purpose of this study was to give new information about using LymphaTouch® in sports for study commissioner, HLD Ltd.

Quantitative research method was used in this research. During the intervention, test subjects were answering to questionnaire for their daily experience of training strain, recovery and their subjective benefits from the treatment. The test subjects were 15-21-year-old active national team level athletes. The intervention was carried out on the Finnish national teams last training camp preparing them for the season.

The results of this research show that the athletes felt the recovery treatment with LymphaTouch® device benefited their training with better recovery.

Is LymphaTouch-Treatment Effective For Shin-Splint? A Quantitative Study On Patients' Experience

Moilanen, T. & Päivänen, J. 2012. B.Sc. Thesis for Degree Programme of PhysioTherapy, Social Service, Health and Sports, Savonia University of Applied Sciences.

Abstract: The purpose of this thesis was to determine how LymphaTouch® treatment effects on anterior leg pain and physical exercise among research group. The aim of the study was to examine, whether research persons leg pain was reduced and whether their moving ability was increased during the treatment. Pain was evaluated during palpation, walking, running and on rest. Moving ability was examined by person's subjective disadvantage to exercise caused by shin splint, and by painless walking and running distance. The aim was also to gather experience of LymphaTouch® treatment on general level.

Twenty research persons received six LymphaTouch® treatments in period of three weeks, all with identical treatment procedure. The measurements for the study were made just before the first, and after the last treatment. The instrument for this trial was developed based on previous studies and theory. NRS-scale was used for measuring pain. Research group consisted of women and men, aged mostly from 18 to 30. Persons exercised regularly and suffered from anterior leg pain, which was increased after exercise and had existed at least a week.



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When compared the means of existing pain, there was reduction on every measured aspect, especially in cases of pain on rest and during running. Disadvantage to exercise caused by shin splint, was reduced. Painless walking distance was increased among 40 %, and painless running distance among 25 % of research persons. 65 % of research persons told that they experienced at least a little help from LymphaTouch® treatments as 10 % told they received no help at all.

The trial suggests that there might be use for LymphaTouch® treatment in care of shin splints though further study should be made with larger research group and more controlled trial.

The Effectiveness Of LymphaTouch-Treatment In Carpal Tunnel Syndrome

Röntynen, J. & Tuomainen, M. 2011. B.Sc. Thesis for Degree Programme of PhysioTherapy, Social Service, Health and Sports, Savonia University of Applied Sciences.

Abstract: The purpose of this study was to determine effectiveness of LymphaTouch® treatment in Carpal Tunnel Syndrome.

The study subjects were applied by advertisement and private persons who had very likely the carpal tunnel syndrome were included in the study. Ten study subjects were participating in this study, and six of them had the treatment in both wrists. Therefore, the sample size of this study was 16 wrists (n=16). Seven wrists were diagnosed by a doctor.

LymphaTouch® treatment was given six times to the study subjects with model of carpal tunnel treatment. Treatment was given 2-3 times a week on average. In first and last course of treatment the study subjects filled the initial and the final questionnaires and they were tested with the initial and the final measurements. After three weeks from the last course of treatment the study subjects filled another final questionnaire. The effect of treatment to the symptoms and hand function were determined in questionnaires and measurements. In questionnaires the study subjects evaluated the volume of symptoms with visual analogue scale. Hand function was measured with Jamar the hand grip strength meter, Pinch the thumb opposition strength meter, goniometer and Phalen's, Tinel's and Tetron's provocative tests. Numeric study material was analyzed by counting arithmetic means and ranges. Open questions were analyzed by itemizing the contents.

LymphaTouch® treatment effected individually and the differences in treatment effects between the study subjects were high. LymphaTouch® treatment reduced experienced symptoms (50 %) and hand function improved on average except hand grip strength. In addition the degree of disability to symptoms in daily living reduced (51 %).

LymphaTouch® treatment reduced the symptoms of carpal tunnel syndrome and improved the hand function at least in short-term. LymphaTouch® treatment is worth of trying as alternative conservative treatment. More research is needed because the sample size of this study was small.



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PROFESSIONALS' TESTIMONIALS AND ARTICLES

Jose Luis Rodriguez Robledo - Just What Football Needs

LymphaTouch is one of the best negative pressure devices in the market for its portability and its durability, just what Football needs. It is a great addition for hands on treatment which allows you to reach deeper levels than just hands on alone.

Jose Luis Rodriguez Robledo

Former First Team Physiotherapist at Liverpool FC



Sandy Templeton - LymphaTouch Treatment for Head and Neck Lymphedema

The LymphaTouch device has been employed for express use of treating all aspects of head and neck lymphoedema with our cancer patients, who have devolved Lymphoedema as a result of either surgery, such as neck dissection, radiation therapy +/- chemotherapy. The presentation of symptoms include: swelling, scar tissue, fibrosis and myofascial adhesions.

We also anticipate use with breast oedema.

The device has been used at a variety of stages but mostly within 2-4 weeks of surgery or radiation completion. As soon as the scars have knit together or the irradiated skin has begun to look less inflamed/red the device has been employed.

The settings for treatment have been determined by treatment protocols recommended through training with the LymphaTouch Inc company, in concert with the therapists clinical assessment of appropriate pressure and duration.



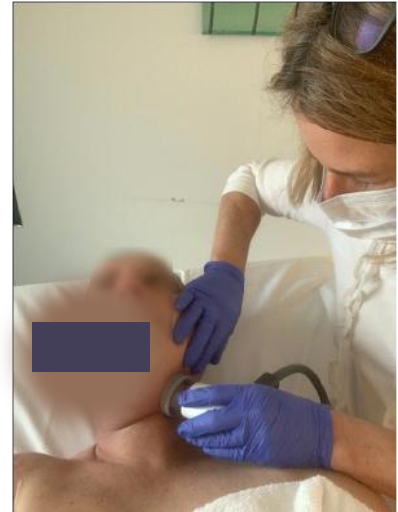
LYMPHATOUCH[®]

Commonly, the Pulse mode and pressure range from 50 – 150 mmHg have been employed, with more fragile tissues having lower pressure, and fibrotic tissues coping with higher pressure.

Pulse duration have been 3-10 before moving to another symptomatic zone. Again fragility and age of the tissues have determined application.

The Lymphatouch device is very easy to use and is well received by patients who find the treatment very relaxing, pleasant and comforting.

The feedback from patients is that they feel the tissue hardness has softened, the colour of the skin has improved and the scars are more pliable.



Sandy Templeton

Occupational Therapist, Senior Lymphoedema Therapist

Chris O'Brien Lifehouse, Sydney

Peetu Lehmus – Extra Boost For Athlete Rehabilitation

Olen käyttänyt LymphaTouch® -laitetta noin puoli vuotta yksityisellä fysioterapian vastaanotolla, jossa valtaosa asiakkaista on urheilijoita. Käyttötarkoitus on ollut pääasiassa urheiluvammat jänne- ja nivelalueet sekä lihasrepeämät, mutta myös lymfakierron häiriöt sekä palautuminen. Laite on käytössä viikoittain kuntoutuksen ja hoidon tukena.

LymphaTouch® -alipainehoito on ollut toimiva hoitomuoto heti akuutin tulehdusvaiheen jälkeen aina kuntoutuksen loppuun niin kivunlievityksessä, turvotuksen poistossa ja vamman paranemisessa. Toki tutkittua faktaa kaipaa lisää omien kokemusten tueksi.

LymphaTouch® -laite on erittäin helppokäyttöinen selkeällä näytöllä ja ohjeilla. Säädöt ovat kaikki nopeasti ja helposti samaan aikaan saatavilla.

I have used LymphaTouch® for six months. I work as a physiotherapist in my own practice where I work mostly with athletes. I have used LymphaTouch® for sports injuries (specially tendon and joint related) but also for muscle injuries, lymphatic problems and recovery treatment. Device is used weekly to give extra boost in rehabilitation and treatments.

LymphaTouch® negative pressure is very capable treatment from after acute inflammation until the end of the rehab. It works for pain relief, increasing lymph circulation and injuries. More scientific facts still needed to support own experiences.

LymphaTouch® is very easy to use, simple with good instructions. You can adjust everything from pressure to pulsation quickly at the same time - easily.

Peetu Lehmus
PT, Athletic trainer



LYMPHATOUCH®

Jeffrey Tucker - Active Negative-Pressure Therapy: Enhancing Lymph Flow

One of the most neglected systems of the body is the **Lymphatic System**. Despite the **lymphatic system's** function to clear all the toxins and impurities in the body and to maintain pressure in the system, it is only recently getting the attention it deserves. The lymphatic system absorbs fluid, macromolecules, microorganisms, toxins, waste products and foreign substances from the interstitial tissue. Numerous substances (electrolytes, proteins, hormones, toxins, debris) and immuno-competent cells (lymphocytes, macrophages) pass through the regional lymph nodes, where this fluid is filtered, purified and concentrated. Scar tissue, increased muscle-connective tissue thickening, and dense fibrosis are factors that can lead to poor lymph drainage and poor treatment outcomes.



A patient's history will help you determine if the lymph system has been compromised. Common symptoms that suggest the lymphatic system needs specific treatment include *bursting pains, tightness or tension, limb heaviness, cramps, pins and needles, decreased skin and joint mobility, increased limb circumference and fatigue*. The most common noninvasive treatment technique is hands-on manual therapy providing gentle, light-touch to influence the whole body. However with the popularity of super-pulsed laser (MultiRadiance), and now the negative pressure (decompression) devices such as LymphaTouch, it is well within the scope of the Chiropractic clinic to offer these patients another therapy option. Using a machine rather than 'touch lymph' drainage can influence acute and chronic inflammation, tissue engorgement, plugged ducts, wounds, fissures, ulcerations, bruises and dermatitis (eczema). I especially like the device for pre- and post-surgical cases, scars, and other post-trauma cases.

With our increased awareness of the fascial system it's important to note that new lymph vessels cannot grow through scar tissue or fibrosed tissues. Cupping, which has become very popular, only offers static negative pressure against the skin in a very local area. The use of a negative pressure device like the LymphaTouch allows gliding along the skin from 'foot to face', which can facilitate and stimulate the natural peristaltic contractions of the two to three layers of muscles located along the lymphatic pathways, also called lymphangions (Mislin, 1961).

Many therapies are designed to remove stagnating fluid, toxins, and wastes, all of which will be drained through the flow of lymph. If you follow the biohacking community, there is an ever increasing discussion about our 'toxic load' from the environment, poor food choices, metabolic waste, after-exercise overload, lactic acid build up, etc. Some of the approaches biohackers use include cryogenic chambers, ice baths, or cold showers. These are all meant to have patients feel invigorated. Other treatments include vibration plates (improves blood flow), and red (infrared and laser) lights to stimulate your mitochondria.

Anything that we can do as practitioners to enhance the flow of lymph via its passage through lymphatic nodes, will allow the body to generate production of more lymphocytes to reinforce the immune response and accelerate contact antibodies/foreign substances. Throughout the course of my day as a hands-on practitioner I often feel like I am moving trapped fluids around. The use of LymphaTouch as a stand alone or in combination with 'super-pulsed laser therapy' can reach trapped and excess fluid directly under the skin. The immediate goal of treatment is softening of the tissues and reduction in the fluid.



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Dr. Jeffrey Tucker, DC



Dr. Tucker's interest in putting together the arts and science of Pilates, yoga, stretching, medicine balls, stability balls, rubber tubing, balance training, chi gong, weight training, cardio training, endurance training, diet, chiropractic, performance enhancement, muscle and massage therapy, has been evolving for more than 30 years.

Dr. Tucker completed Chiropractic training at Los Angeles College of Chiropractic. He has a post graduate Diplomate degree in Rehabilitation and is certified in chiropractic spinal trauma. He is a past-president of the Santa Monica Chiropractic Society. Dr. Tucker is the current president of the American Chiropractic Association Rehabilitation Council. He is a member of the California Chiropractic Association and the American Chiropractic Association. He won a KARMA award and was named Chiropractor of the Year from the Los Angeles Alternative Medicine group. He is the designated and selected Chiropractor for The Massage Therapy Center in Los Angeles. He is author of numerous articles and publications on soft tissue injuries. He has been in continuous active practice for the past 30 years in the west Los Angeles area. He has completed advanced education and clinical training in rehabilitation, sports medicine, nutrition, and functional exercise training.

Dr. Tucker continues teaching other doctors speaking on biohacking, exercise as medicine and current treatments to other Doctors around the country. He teaches post graduate training in the cervical spine, lumbar spine and temporomandibular joints (TMJ). His practice includes chiropractic, postural assessment/conditioning, gait analysis, therapeutic exercise, and muscle/soft-tissue therapy.

Dr. Tucker serves the communities of Santa Monica, West Los Angeles, Beverly Hills, Marina del Ray, Encino, Brentwood and Los Angeles.



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Erja Kouri & Monica Ebneht-Pihlaniemi - Efficient Therapy Together With Active Exercising

We have used LymphaTouch in physiotherapy from 2010 as a part of therapy in musculoskeletal disorders, pain and fascial therapy, scars, and pre- and postoperative treatments of swelling.

Musculoskeletal disorders make up a large area of our physiotherapy practice. One part of this includes treating joint related pain disorders and the loss of mobility in acute and chronic phase in order to reduce pain, swelling and improve the range of motion. Proper functioning of the lymphatic system is critical to our body's ability to regenerate tissue and recover optimally. Following traumas and sport injuries, for example ankle sprains, LymphaTouch treatment should be started as soon as possible and done preferably on daily basis for good treatment results and optimal recovery.

Our physiotherapy practice uses LymphaTouch also for pre- and postoperative treatments. One of our suggestions is a preoperative treatment one day before the operation. In case of our clients, these operations mostly include knee, hip or shoulder operations. Scar treatment consists of several treatment techniques and it is started after the stitches have been removed. Scars with poor mobility are sometimes treated even months after the operation.

Fascial treatments are one important part of manual therapy techniques and LymphaTouch is a great device for fascial system treatment combined with manual therapy. The device helps to reduce pain through fascial stretch and decompression of tissues; this is achieved through a suction combined with an upward lifting movement and rotation. With its really sensitive measures, LymphaTouch works extremely well also with low decompression and is often the best way to start fascial treatment as well as to help balancing recovery in sport injuries. In soft tissue problems, LymphaTouch gives a good pain reduction and it works efficiently together with active rehabilitation and training.

We recommend LymphaTouch for physiotherapists, who work frequently with musculoskeletal disorders, active rehabilitation after operations, sport injuries and traumas where swelling and scar tissue is an everyday problem.

Mike Voight & Ashley Campbell – Powerful Tool In A Toolbox For Hip Patients

At Nashville Hip Institute we have found the LymphaTouch to be a very valuable modality for decreasing soft tissue pain and dysfunction. It is very common for our hip patients to have quite a lot of soft tissue pain both near and distal to the hip joint and the LymphaTouch allows us to decompress and/or desensitize the tissues allowing for improved mobility and better neuromuscular activation. We are very excited to have this powerful tool added to our toolbox!

Mike Voight

PT, DHSc, SCS, OCS, ATC, CSCS, FAPTA

Ashley Campbell

Director of Rehabilitation, PT, DPT, SCS, CSCS



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Leena Vallin – Excellent Tool For Comprehensive Care

Sairaanhoitopalvelu-Leena produces service for pain management and manual lymphatic drainage in Porvoo, Finland. Operation started in 2007.

Leena Vallin, yours truly, is a nurse and entrepreneur but also the only person working at the company. I'm a nurse who is specialized in internal medicine surgery with working experience of 30 years in health care. I have finished my degree in Pain Management Expertise in JAMK University of Applied Sciences in 2000-2002. I graduated as a lymphatic therapist in 2009 when I also purchased my very first LymphaTouch device. Since then, I've used it every day with every single of my patients in treating both pain and swelling. It is impossible to count the hours used with the device anymore! Number of patients has been more over 900 treatment sessions per year at best. But now I've been consciously trying to reduce the number of patients.



LymphaTouch device is an excellent tool for comprehensive body care. Device works as a third hand of a nurse/therapist. It helps gently to treat tissues and structures that would be hard to reach with own hands (e.g. suboccipital muscles, intercostal muscles and joint spaces). However, it is important to understand some physiology, anatomy and biochemistry to justifiably support body functions with the device and choose proper settings and pressure values for treated area.


LymphaTouch helps me to activate tissue metabolism, mobilize skin, connective tissue and muscles and treat joints and fibrotic tissue easily and effectively. Negative pressure is gentler way to treat sensitive and fragile skin compared to hands. In terms of neuropathic pain, negative pressure might be the only method that painful area can tolerate without pain increasing unbearable. LymphaTouch is a game changer in reducing swelling. I can activate lymphatic system fast and effectively by pulling the tissue. I can redirect fluid with negative pressure according to watersheds. Negative pressure combined with high frequency vibration soften up and break fibrotic tissue, developed by swelling, better than manual treatment. LymphaTouch treatment is cost-effective, since LymphaTouch treatment fastens up the results of the treatments and shortens up treatment sessions.

I use LymphaTouch for acute (e.g. sprains, ruptures, bruises, postoperative pain, acute muscle related pain etc) and chronic pain (MSD, rheumatic pain, arthrosis pain, cancer related pain, metabolic diseases, diabetic neuropathy, CRPS etc.) management. Most of my patients are affected by lymphedema as a result of mechanical dysfunction of lymphatic system after cancer surgery or radiation, and also lipedema patients.

I recommend LymphaTouch-device for all therapists who deal with body care in their work.

Leena Vallin, Nurse, Specialist in Pain Management, CLT, Entrepreneur
 Sairaanhoitopalvelu-Leena
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Justine Whitaker – Improving Veteran's Lives With LymphaTouch



Northern Lymphology
The Forest of Bowland Treatment Centre

Improving Veteran's lives with LymphaTouch

Our national and global security is both essential and complex. Striving for peace and protection requires our service men and women to put themselves in situations which sometimes leave them with complex medical needs. When this does occur, it is essential to have the best medical care and equipment available to enable them to rehabilitate swiftly and remain in their own setting, reducing hospital admission and length of stay.

I have used LymphaTouch for 5 years within the veteran community and have managed to do exactly this. As well as the afore mentioned, LymphaTouch has dramatically reduced tissue congestion, reduced swelling and inflammation, improved quality of life and reduced the number of episodes of cellulitis (tissue infection). Not only does it benefit the patient but also the therapist as prior to the LymphaTouch, manual work with hands was required and this takes its toll over time. It is a treatment that allows continuity of care between practitioners without compromising the quality of treatment delivered.

Upon discussing the use of the LymphaTouch with a Veteran who is receiving treatment with this device, he said...

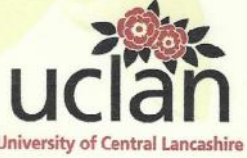
"It gives me confidence knowing something can be done with lasting effects. It means I can continue on a daily basis and.... live a life" *Veteran - UK*

Mrs Justine C Whitaker MSc, RN, Director & Nurse Consultant - Northern Lymphology Ltd




Northern Lymphology
The Forest of Bowland Treatment Centre

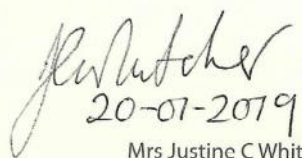
Director & Nurse Consultant



Senior Lecturer
Faculty of Health



Lead Lymph Specialist



20-07-2019

Mrs Justine C Whitaker
Director and Nurse C

Dunnow Hall,
Nr Clitheroe, Lancashire

Directors:
Whitaker & Richard LK Whitaker
No. 6988836



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Natalie Perkins – From Big Hesitation To Great Impression

I am a physiotherapist with an additional degree in exercise physiology with nearly 30 years of experience almost exclusively in the treatment of musculoskeletal conditions. I have travelled the world with a sport team for a decade, been involved with the treatment of Olympic athletes, professional football players, elite gymnasts, high level rugby players, low level soccer players and nursing home patients and assisted mums, dads, kids and grandparents with their pain and dysfunction so I've pretty much treated the full spectrum of the community and until recently I relied on my hands....and my hands alone.

Over the course of my career I have trialed a number of various therapeutic devices, all promising miracle cures for my patients with the touch of a button but, whilst a number of them did indeed have a positive therapeutic effect, they were never able to achieve the same results as I could achieve with my own hands.....until I discovered the LymphaTouch.

I was shown the LymphaTouch by a colleague and on initial glance was not impressed. It looked like it was just a fancy, westernised form of Chinese cupping (which I had used previously in my career with some good effect but again, found better results with my own 10 digits with the added value of not leaving alien love-bite marks on my clients). More out of politeness and respect for my colleague, I agreed to trial the device as he was interested in my professional opinion and I suspect quietly smug that he knew, despite my well known disdain for "toys" that I was going to be impressed. He was not wrong!

I was able to assess the soft tissue of the next few clients before and after the application of the LymphaTouch and had to reluctantly but excitedly concede that the device had indeed made a significant difference to the activity of the tissue. More than anything however I was impressed at how the result was achieved without any form of discomfort to the patient. Many times the manual soft tissue releases I have performed were incredibly effective but unfortunately also highly uncomfortable for the patient. I always maintained that if I could somehow achieve the same results that my hands did without the pain of treatment then I have hit the jackpot. With the LymphaTouch I have pretty much done just that.

I now have a team of staff, all of whom fight each other for possession of the LymphaTouch on a daily basis and, as a clinical educator for final year physiotherapy students from both Australia and the USA, each of them has left their clinical placement with me with the goal of getting a LymphaTouch into the first clinic they work is so that they can continue to provide clients with the same great results that they were achieving on their clinical placement. The application of the LymphaTouch is not only an asset for patient care (always the primary

objective in my mind) but also alleviates stresses on the hands of the therapist. My hands wish I had discovered this device years ago and whilst it cannot reverse the arthritic changes that have already occurred in my fingers, it most certainly will minimise further deterioration and already has reduced the pain I previously experienced on a daily basis.

My single greatest criticism of the LymphaTouch is that previously patients would be in awe of the relief that my hands would give their aching bodies. They would tell me how amazing and skilled I was. Now they tell me how clever the LymphaTouch is and how much they love IT! The true genius of this device is that even the worst manual therapist will still get fantastic outcomes using a LymphaTouch!

Natalie Perkins
Principal physiotherapist
Bodyworks consulting
Australia



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PATIENT TESTIMONIALS AND ARTICLES

Elias Kuosmanen - Finland's National Team Wrestler

My name is Elias Kuosmanen. I'm 25 years old Finnish national team wrestler from Vantaa. Beside of competitive sports at the highest level, I work as a noncommissioned officer of military sports in the Finnish Defence Forces. In my wrestling career, I have achieved multiple medals in youth age groups among World and European Championships. In the adults age group, the best achievements so far have been two bronze medals from European Championships. In 2019 World Wrestling Championships, I ranked 11th.

First time, I became familiar with LymphaTouch during winter 2019. I was preparing for the next spring European Wrestling Championships and the amount of exercise increased heavily. It was Finnish national teams camp in February, the second-to-last training when I charged on an opponent on the wrestling mat and heard a bang from my inner thigh with immediate intense pain. The MRI showed a tear in my Adductor Longus muscle. I needed to skip the Finnish national Championships. If I wanted to earn my spot in the upcoming European Championships, I would have to rehabilitate myself before the last chance to proof and secure my spot in the Thor Masters wrestling tournament in Denmark in March.

The rehabilitation of my muscle injury started shortly led by a doctor and an excellent physiotherapist. Beside active therapy, we started LymphaTouch treatments to soften up muscle cramps, to enhance muscle metabolism and to accelerate rehabilitation of Adductor Longus muscle.

By combining LymphaTouch treatment with active exercises and cryotherapy, the injury started luckily to heal fast. I managed to trust myself enough, dared to jump on the plane and head to the Denmark's tournament. In the morning of the competition, I softened up my Adductor Longus muscle with portable LymphaTouch device, spread half a tube of "hot balsam" and stepped on the wrestling mat. After two intense competition days and six tight matches, I stood at the highest step of the podium. I was so relieved! My Adductor Longus muscle worked and I earned my spot at the European Championships – from where I eventually came home with a bronze medal.

From this experience, I can recommend LymphaTouch to be used as part of the muscle injury rehabilitation.



Elias Kuosmanen

Finland's National Team Wrestler



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Susan's Story – The Impact Of Lymphedema

"I'm Not That Sickly Person Anymore!" A Cancer Survivor's Extraordinary Rejuvenation Thanks to LymphaTouch

The Impact of Lymphedema

Seven years ago, a fall on a patch of ice changed Susan's life forever. Before that incident, Susan enjoyed an active lifestyle just outside Toronto, with a career in the fashion industry, and a thriving young family. "I considered myself fit and healthy," she said. "I took pride in that." Everything changed after the fall. Although it didn't injure her too badly, the x-rays she got in the hospital revealed a much more serious problem: breast cancer.

A year of battling the illness with harsh chemo and radiation therapy finally culminated in a complete mastectomy of her right breast. The drastic treatment worked. Susan was cancer-free. But another diagnosis followed shortly thereafter – lymphedema.

To remove Susan's breast, her surgeons also had to remove some of the lymph nodes under her right arm. These nodes help to filter and circulate lymph fluid around the body, which is critical for clearing away debris, and warding off infections. Without these lymph nodes, a reservoir of lymph built around Susan's arm. The arm swelled up, and became extremely vulnerable to infection. "It was like a handicap," Susan said. "I hated it. My arm ballooned, the skin looked off, and I couldn't lift more than five pounds with it."

Susan's condition also came with serious risks. Three or four times a year, her arm would inflame with cellulitis – a potentially life-threatening infection of the skin. The condition requires immediate hospitalization, and a strong battery of antibiotics. The repeated experiences made Susan miserable. Her frequent hospitalizations also started to affect her career. Susan had to miss important business trips to New York City. She couldn't reliably keep appointments.

Worse, her friends didn't understand it. They didn't grasp the underlying causes behind Susan's illness. "They couldn't understand that these flare-ups were mostly out of my control," Susan said.

Even her husband and son, who she could always count on for support, had started to see her differently. Susan noticed a new note in their relationship – pity. Instead of the lively, vivacious professional she used to be, now she seemed like a frail, sickly woman. This was devastating for her. "I hated being seen that way, as 'the sick person,'" she said. "That's not who I am. Certainly not who I want to be."

"I hated being seen that way, as 'the sick person. That's not who I am. Certainly not who I want to be."

Years of battling the disease, of exhausting trips to the hospital every quarter, finally came to a head two years ago. A new bout of cellulitis struck her arm – this one much worse than the others. Clinical staff could not reduce the swelling. The bacteria in her skin resisted antibiotic treatment. At no point could her doctors deliver her any reassuring news. For her entire 13-night stay, Susan was warned that she stood a good chance of losing her arm, or even dying.

Luckily, Susan was discharged intact. But the experience shook her fundamental sense of well-being. More than sickly, now Susan felt afraid and hopeless. Even worse, she lost any sense of safety. The next encounter with cellulitis could be mere months away – and there was no guarantee she'd survive it.

To Johns Hopkins, for LymphaTouch Therapy

This frightening revelation motivated Susan to take drastic action. She flew down to Baltimore, to see an oncology rehab specialist at Johns Hopkins. One of the specialists, Kathy McGinty, introduced Susan to The LymphaTouch.

"When I first met Susan I could tell she was feeling pretty despondent," Kathy said. "She was at stage II, or early stage III lymphedema." This meant that protein-heavy lymph fluid had gathered around Susan's arm, and started to turn her tissues fibrotic.



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"Parts of her arm had that thick, doughy feeling consistent with fibrosis," Kathy observed. "That was the first symptom I knew The LymphaTouch could help with."

But when Susan first clapped eyes on The LymphaTouch, she had a skeptical reaction. "I didn't want to try it at first," she said. "I had tried other therapies, and nothing was working. I didn't think this new machine could help."

Kathy has noticed this reaction from most patients who come to see her. "Manual massages can be therapeutic, and they're gentle, so patients can get attached to how they feel. But The LymphaTouch does work things that hands just can't. I coaxed Susan into giving it a try."

During that first session, Kathy used The LymphaTouch's negative pressure to lift the fibrotic tissue of Susan's skin. This expanded the space for blocked-up lymph to circulate. Then, a gentle mechanical vibration shook the fibrotic tissue, softening it almost immediately. "I noticed a change in how my arm felt right away," Susan said. "Honestly I was shocked."

"The LymphaTouch started to give her arm tissue some pliability and suppleness," Kathy said. "I knew it was doing its job."

With continued sessions, Susan started to see other important improvements. Her arm lost its discoloration. It regained mobility and function. And before long, Kathy observed an even bigger change: "She was getting happier every time she came in and her emotional strength was coming back," Kathy reported.

"Those first few sessions had a big impact on my mood," Susan said. "I started feeling hopeful again. I felt safe for the first time in years."

"I noticed a change in how my arm felt right away. Honestly I was shocked."



More Therapeutic Possibilities

Kathy reports that Susan's results are typical for her patients. "For lymphedema patients, it used to take five or six weeks to get them ready to discharge. But with the LymphaTouch that time's down to three weeks."

She's also been continually delighted at the range of applications for the device. "I've gotten patients off feeding tubes after treating myofascial restrictions of facial muscles; I've taken patients off Foley catheters after treating lymphedema of the genitals; I've seen it help heal irradiated tissue after cancer treatment, restore proprioception for patients with peripheral neuropathy, and I've even seen it help treat Lyme Disease," Kathy said, "and," she went on, "at the end of the day my hands feel much better, because I'm not doing so much manual massage."

Kathy says that she couldn't imagine working without it.

A New Life After Treatment

But for Susan, The LymphaTouch's most important effect wouldn't become obvious for a while. It's been almost a year and a half since those first sessions. In that time, Susan's arm only went through one mild bout of cellulitis. That's an enormous improvement from three or four serious infections every year.

"I'm not that sickly person anymore!" Susan says, delighted. "I'm at this new plateau of health. And it takes work to maintain it. But the LymphaTouch is what brought me here, and it's what's keeping me here."

Susan would recommend the device for anyone going through a similar struggle, even if they're feeling skeptical. "You have to try it! Why not? What do you have to lose?"

"I'm at this new plateau of health. And it takes work to maintain it. But the LymphaTouch is what brought me here, and it's what's keeping me here."



LYMPHATOUCH®

Marina's Story – Back To Playing Flutes After A Serious Wrist Break And Painful Neuropathy

“The LymphaTouch machine has been a vital part of my healing from a serious wrist break, titanium implant surgery and many months of extremely painful neuropathy.

When I began my PT sessions, I had already had six weeks of Occupational Therapy, which had not helped much. My shoulder, elbow, wrist and fingers were all locked. My surgeon recommended that I should have Stellate Ganglion Blocks as pain management. He also said he didn't know if I would ever be able to play my flutes again. (I am a recording artist who plays wooden flutes.) I had no interest in nerve blocks or pain management. I wanted healing!

Then I started sessions with my PT on this amazing machine. It took time, sometimes two sessions a week and then down to one weekly, and finally, every 2-3 weeks. Together with my PT's gift of healing, the LymphaTouch and persistent homework on my part, I have recovered about 95% of my range of motion. I will continue until I am 100%. All of my nerve pain is gone completely, and I am able to play my flutes again!

My deepest gratitude to the developer of this marvelous machine. It has helped me to regain my life.”

Marina Raye
Black Mountain, NC
May 9, 2015

Tammy's Story – Head And Neck Cancer Survivor



“This device helped me, and it saved my life. And I know it can help other people too.”
-Tammy Woodham, cancer survivor

Tammy Woodham was diagnosed with stage III tongue cancer that relapsed two and a half years later with multiple metastasis in her head- and neck-area. She went through several surgeries, chemotherapy and radiation which all caused her major problems in both speaking and functionality of face, neck and upper

body and activities of daily living. She worked long time with a physical therapist to treat the swelling that was caused by cancer treatments and found out that she has a disease called secondary lymphedema.

Eventually she met an occupational therapist Kathy Konosky from the University of Michigan who treated Tammy with several methods to reduce the swelling. Once Kathy used LymphaTouch on her, the effect was instant. LymphaTouch immediately released all the pressure that Tammy has had in her chest for a long time and she felt herself free again. She can move and talk much better than before LymphaTouch® treatments.

See Tammy's story full-length at lymphatouch.com/



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Short Patient Feedback

B.R. - A Little Machine that does wonders

"To whom it may concern,

I've been going to Louisa (occupational therapist) for almost a year now. She has helped me tremendously on my lymphedema are working on my legs.

My legs are half the size of what they were when we began this project. A little machine that she is using right now had it done wonders and has found pockets in my entire body that needed to be unclogged and released, I feel so much better after the treatments and I can breathe better and not weeze.

I look forward to seeing her on Tuesdays and Thursdays for my treatment."

T.B. - How has the negative pressure and vibration helped?

Feet – I am a very brittle diabetic and suffer from sever neuropathy in my feet. With treatment of negative pressure, I started having more feeling in my toes and feet.

Lymphedema – I started having problems in January 2020 with cellulitis in my lower legs. Medication did not help. I was referred to physical therapy which used negative pressure and vibration with compression hose. After three weeks, the cellulitis is gone and I can now walk $\frac{3}{4}$ mile each day.

Chest – I am a Vietnam veteran with diabetes, COPD, sleep apnea and asthma. I always have sinus drainage and chest congestion. While in pt I had muscle cramp under my rib cage. The therapist used negative pressure with vibration on my back which eased the muscle cramp. 2-3 hours later, I coughed up a good amount of mucus which improved my breathing. I recommend negative pressure and vibration treatment to anyone with breathing and mobility problems.

Ms. D. - Great improvement in recovery

"Before my therapy, I was unable to do arm stretches. My therapist started me on the LymphaTouch allowing my muscles to expand more with no pain! Much improvement I notice toward recovery of my movement.

Thank you for great invention."

M. W. - Breast Lymphedema

"My breast feels less heavy – I would highly recommend this device as it is comfortable and soothing."

M. C. - Head & Neck Lymphedema

"I can see that my tissues are less red and the swelling has reduced – it was a pleasant non -invasive treatment"



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LEARN MORE ONLINE

ARTICLES BY PROFESSIONALS

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Emerging Technologies in Rehabilitation Medicine

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Väyrynen, M. 2019. Omni-Athlete blog post.

Read the articles and much more at lymphatouch.com

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LYMPHATOUCH®



wilk_kevin



Today
1:14 PM



Today
3:11 PM

howlsportspine



Before

southwestrehabryuma



After

southwestrehabryuma



physiquipe



astheticsltd



LYMPHATOUGH[®]



LYMPHATOUCH[®]

Feel the Performance[®]

ACCESSORIES



10 mm treatment cup for

- Local, adhesive scars
- Face and neck areas
- Fingers and toes
- Small joints and tendons

LymphaTouch[®] Rollstand

- Convenient for clinic use



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LYMPHATOUCH® LT01

TECHNICAL SPECIFICATIONS

DIMENSIONS	19 x 10 x 11,5 cm / 7.5 x 3.9 x 4.5 in.
WEIGHT	1.1 kg / 2.43 lbs
POWER REQUIREMENTS	Adapter: 100-240 VAC, 50-60 Hz Output: 15Vdc, 2A, 30 W
BATTERY	Rechargeable Lithium Ion battery with up to 8 hours continuous use
DISPLAY	TFT LCD: 4.3" 800 x 480
NEGATIVE PRESSURE SETTING	Pressure range 20-250 mmHg
PULSATION AND PRESSURE	Pulsation range 0.5-5 s
HIGH-FREQUENCY VIBRATION	Vibration range 20-90 Hz
TREATMENT CUPS	10 mm, 35 mm, 50 mm, 60 mm, 80 mm
TREATMENT CUP FILTERS	Single use medical grade air filters to maximize hygiene
CLASSIFICATION	Medical device CE-MDD/93/42/EEC, Class 2a, CSA C22.2, FDA class I Exempt, NRTL cert.
STANDARDS	ISO 13485:2016, IEC 60601-1, IEC 60601-1-11
WARRANTY	2 years, excluding batteries and accessories

Always read the contraindications and user manual before using the device. If you are uncertain of the suitability of the device for the treatment, always seek advice from a healthcare professional prior to starting the treatment.

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LymphaTouch® and PhysioTouch® units are CE certified and FDA Class 1 Exempt devices. RX Only. LymphaTouch Inc. is ISO 13485:2016 certified. Always read contraindications and user manual before using the device. If you are uncertain of the suitability of the device for the treatment, always seek advice from healthcare professional prior to starting the treatment. © Copyright 2021 LymphaTouch Inc. All Rights Reserved. MKTG-6-4

