

09. Drug Therapy, Physical Treatments & Adjuvants for Lymphedema

Sub-bandage pressure variables in adhesive 2 component bandages for the lower limb

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Sub-bandage pressure variables in adhesive 2 component bandages for the lower limb

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Introduction: Compression therapy is a key cornerstone of edema treatment. A disadvantage of compression bandaging is the significant drop in sub-bandage pressure over time; up to 50% loss after 2h of wearing. Adhesive and cohesive compression bandages are thought to

circumvent this problem. However, earlier studies of our group have demonstrated a drop in sub-bandage pressure in adhesive bandages as well.

Objective: To assess the sub-bandage pressure variables in adhesive compression bandaging and to test the application of an additional compression layer after 2h.

Methods: 9 healthy volunteers (18 lower limbs) were enrolled to wear one of two 2-component compression bandages (Coban or Coflex). Sub-bandage pressure variables and stiffness were assessed after application, 1h of normal activity, 2h of normal activity. After 2h of normal activity an additional compression layer was added to the bandage. Next, pressure variables were assessed again after the application of the additional layer and after 1h of normal activity. All pressure readings were done using a Picopress (Microlab, Italy).

Coban or Coflex were randomly dedicated to the participants. One application was done by a trainee physical therapist and the other limb was bandaged by an experienced physical therapist.

Results: The study is still ongoing but we will be able to present the results concerning:

1) Sub-bandage pressure after application; 2) during tip-toeing at application, 1h, 2h, additional application and again after 1h of wearing. 3) we will present the results between Coban and Coflex, 4) we will present the results comparing the application done by an experienced vs trainee physical therapist.

Conclusion: We will conclude on the possibilities toward the use of 2-component bandages with regard to sub-bandage pressure and make suggestions for clinical use.

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An evidence based prospective surveillance model for prevention and early treatment of breast cancer related arm lymphedema

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Background: Treatments for breast cancer often include extensive surgery, chemotherapy and radiation therapy, which are risk factors for lymphedema, as well as high BMI and inactivity. Evidence supports prospective surveillance to prevent or mitigate the problem. The goal of the evidence based model is to promote surveillance for early diagnosis and treatment of lymphedema.

Method: A prospective surveillance model has been established in the mid 90ies for early identification and treatment of arm lymphedema following breast cancer treatment. Lymphedema has been defined as palpated increase of subcutaneous tissue, as well as a lymphedema relative volume (LRV) of $\geq 5\%$ compared to the healthy side and adjusted for handiness. When lymphedema is identified the women immediately get compression treatment and patient education in exercise, skin care and weight control. In the last 10 years the identification of increased local tissue water (dermal backflow) by Tissue Dielectric Constant (TDC) has been added for early diagnosis.

Results: This model is supported by evidence from several studies at Lund University over more than two decades. Evaluation of this surveillance model in a 10-year follow-up show that in a cohort of 292 breast cancer patients at risk of lymphedema, 111 (38.7%) developed lymphedema, with a negative predictive value of 95% (controls, n=40). It was also revealed that after mean 4 years with compression treatment, 28% showed LRV $<5\%$. Based on this finding an RCT was carried out in 70 women with mild arm lymphedema identified by TDC (ratio 1.30-1.45), LRV($\geq 5-8\%$) and palpation of increase in subcutaneous tissue. They were randomized to compression treatment group (CG) with daily wearing of round knitted sleeves (ccl 1) for 6 months, or no compression (NCG). At the end of the RCT a larger proportion of women in the NCG (57%, $p<0.001$) showed progression (increase of LRV $>2\%$ from start of intervention or exceeded LRV 10%) compared to the CG (16%). Also, the end of the RCT was followed by a one-month treatment break in CG, but resumed by progression. At 9- and 12-months follow-up, still a larger proportion of women in the NCG ($p<0.005$, 0.012) showed progression (61%, 67%) compared to the CG (22%, 31%), respectively. In the CG 12% and in the NCG 20% exceeded LRV= 10%. More than 30% of NCG did not progress at all. No changes of LRV and local tissue water were found at any follow-ups but were stable on a low level, revealing that both groups whether they had to wear compression or not, were stable on a low level. It was also found that overall, the lymphedema specific HRQOL is high, with only a minor difference between the groups, measured by Lymphedema Quality of Life Inventory (LyQLI).

Conclusion: A prospective surveillance model can be integrated in rehabilitation of breast cancer patients at risk of developing lymphedema, for early identification of mild arm lymphedema and treatment. To avoid progression of mild arm lymphedema to become chronic and to maintain a high

lymphedema specific HRQOL, compression sleeve ccl 1 may be applied immediately at early identification of mild BCRL, and patient education.

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MANUAL LYMPH DRAINAGE IS AN IMPORTANT PART OF LYMPH EDEMA TREATMENT: PROVEN BY 500 THERAPISTS

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MANUAL LYMPH DRAINAGE IS AN IMPORTANT PART OF LYMPH EDEMA TREATMENT: PROVEN BY 500 THERAPISTS

ISL – GENUA 2023

Tim Decock: Principal Dr. Vodderschool B/N
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President MLDV Belgium

Introduction:

In developed countries, the main cause of lymphedema is widely assumed to be treatment for cancer. Indeed, prevalences of 12-60% have been reported in breast cancer patients and of 28-47% in patients treated for gynecological cancer. However, it appears that about a quarter to a half of affected patients suffer from other forms of lymphedema, eg primary lymphedema and lymphedema associated with poor venous function, trauma, limb dependency or cardiac disease.

Although lymphedema is not a life-threatening disorder, it is a chronic condition that can create considerable disability with recurrent infections in the limb, functional impairment and pain. In addition, research has demonstrated significant psychosocial morbidity, and poorer quality of life.

Even though it may be greatly ameliorated by appropriate management, many patients receive inadequate treatment, are unaware that treatment is available or do not know where to seek help.

Treatment should comprise a holistic and multidisciplinary approach that encompasses all aspects such as assessment by a trained and experienced lymphedema specialist, exercises tailored to the patient needs and functionality, manual lymph drainage, effective thin profile compression therapy and skin care. Although the last years lymph drainage has been considered as not necessary, we are sure that it is an undisputable part of the treatment. 500 therapists have proven that the results before and after one treatment makes a change.

Method:

In Belgium and The Netherlands we follow the consensus of ISL for the training of our physiotherapists to become lymph specialists. Lymph drainage is an important part of edema therapy. Only MLD is not enough for the treatment but treatment without MLD doesn't give the same good results.

Following research will show the need for MLD.

Included: patients with lymph edema with pitting and a positive Stemmer.

Excluded: patients with generalized or lipedema.

Our Care Pathway for community patient consists of:

Phase 0: Diagnosing by the physician (lymphoscintigraphy, fluoroscopy, US,...)

Phase 1: by Physical therapist

1. Measurements of current situation by Perikit or meter
2. Manual lymphdrainage ad modum Vodder for ½ hour.
3. Measurements of current situation by Perikit or meter after treatment.

Conclusion: Till now MLD is still a part of the treatment. Following results will show that it has to stay that way. Before and after one treatment are big differences in volume. Most of them are measured by the Perikit, a part of them with the measuring tape we already use for years.

09. Drug Therapy, Physical Treatments & Adjuvants for Lymphedema

EFFICACY OF FLUIDOTHERAPY ADDED TO COMPLEX DECONGESTIVE THERAPY IN PATIENTS WITH UPPER EXTREMITY LYMPHEDEMA DEVELOPMENT AFTER BREAST CANCER TREATMENT

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EFFICACY OF FLUIDOTHERAPY ADDED TO COMPLEX DECONGESTIVE THERAPY IN PATIENTS WITH UPPER EXTREMITY LYMPHEDEMA DEVELOPMENT AFTER BREAST CANCER TREATMENT

Objective: To determine the efficacy of fluidotherapy added to complex decongestive therapy (CDT) in reducing edema in patients who developed upper extremity lymphedema after breast cancer treatment.

Material and Method: Thirty two female volunteer patients who developed stage 2-3 upper extremity lymphedema after breast cancer treatment were included in the study. The patients were randomly assigned to one of two groups: standard treatment with CDT alone and CDT + fluidotherapy. Before the study, both groups were given a training and home program consisting of remedial exercises and skin care. All patients received 15 sessions of treatment over three weeks. Circumferential and ultrasonographic (USG) measurements of all patients were performed before and after treatment. Treatment efficacy was evaluated based on extremity volume and soft tissue thickness.

Results: The demographic data and volume measurements of the patients were similar at the beginning of treatment. There was a statistically significant decrease in the affected extremity in both groups in post-treatment circumferential measurements. However, the reductions in volume difference and volume difference percentage were significantly higher in the CDT + fluidotherapy group ($p=0.017$ and $p=0.009$, respectively). In the USG measurements, a greater decrease was observed in the soft tissue thickness below the elbow in the CDT + ultrasound group compared to the CDT alone group ($p=0.023$).

Conclusion: In the treatment of upper extremity lymphedema after breast cancer treatment, fluidotherapy added to CDT resulted in a reduction in edema. We consider that when added to CDT, fluidotherapy can increase the efficacy of treatment by reducing edema in stage 2 and 3 lymphedema cases.

09. Drug Therapy, Physical Treatments & Adjuvants for Lymphedema

Dot IPC new combined techniques of mechanical Lymphodrainage

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“Dot IPC new combined techniques of mechanical Lymphodrainage”

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INTRODUCTION

We recently experienced a global pandemic, COVID-19, which led us to reflect on how to refine and improve the possibility for patients to perform effective treatment independently, at home, but still under the guidance of trained personnel. With this purpose therefore, we remodeled the use of the Intermittent Pneumatic Compression by placing it alongside the treatment plan and making sure that the patient could be treated even without the physical presence of a caregiver.

OBJECTIVE

The objective of this study is to demonstrate the efficacy of complex decongestive therapy treatment in patients with primary and secondary lower extremity lymphedema through the use of Intermittent Pneumatic Compression associated with the use of DOTs. We want to determine whether, through this new treatment protocol, it is possible for the patient to operate independently at home, without the need for frequent visits to Health Facilities. We consider this way an upgrade over the normal uses of Intermittent Pneumatic Compression.

METHOD

Patients with primary and secondary lower extremity lymphedema underwent the "DOT IPC" protocol. These are Intermittent Pneumatic Compression sessions associated with special leggings with self-adjusting possibility to adapt to the patient's morphology, characterized by Dots that create differential pressure between relief areas and surrounding areas. Thanks to this legging, better drainage can be achieved on the principle by which specific anti-fibrosis maneuvers were also performed in the Foeldi school. The sessions were performed weekly, for the duration of 50 mmHg, with pressure 35 mmHg in a sequential peristaltic pattern. We later evaluated these patients in the before and after treatments with a 3d perometer, verifying its efficacy in addition to the normal to the protocols already in use for intermittent pneumatic compression. We are confident that further investigation and scientific validation through multicenter studies are needed. But

our preliminary data suggest that in the absence of the ability to physically travel to specialized clinics, this could be an additional aid to patients and caregivers.

RESULTS

A significant reduction in fibrosis following single application and an important reduction in edema at the end of the treatment cycle were noted. Based on the results obtained, we can argue that an important improvement in the clinical picture can be achieved with only the DOT IPC protocol performed independently by the patient at home.

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Highlighting the Difference Between Baseline and Preoperative Measurements: Lymphatic Therapy's Role in Optimizing Edema Control Before Lymphatic Surgery

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Introduction:

Surgical treatment of lymphedema requires that patients demonstrate compliance with self-care and achievement of decongestive optimization preoperatively to optimize postsurgical outcomes. Preoperatively, lymphedema therapists obtain baseline measurements and ensure patients can achieve full decongestive benefit from conservative therapies. Ideally, final preoperative measures reflect improvement from conservative management. The purpose of this study was to measure changes in patients' limb volume, bioimpedance values, and lymphedema quality of life (LQOL) scores preoperatively to assess improvements from conservative management for surgical optimization.

Methods:

We retrospectively reviewed patients presenting to the Boston Lymphatic Center between May 2017-February 2023 who later received either debulking or vascularized lymph node transplant surgeries. Only preoperative visits leading up to a patient's first surgical intervention were reviewed. We analyzed changes in limb volumes, bioimpedance (LDEX) scores, and lymphedema quality of life (LQOL) scores.

Results:

A total of 133 debulking and vascularized lymph node transplant surgeries were performed, of which 108 surgeries were a patient's first surgical intervention. 5 patients were excluded from the study as their limb volumes were calculated initially with circumferential measurements and then subsequently by perometer. Of the 103 remaining patients, 58 (56.3%) were deemed to be optimized for surgery at time of evaluation and 45 patients (43.7%) were noted to still require decongestive management prior to surgery. Modes of decongestive management included: Course of complete decongestive treatment, optimization of compression (increasing hours in compression and/or changing mode of compression), and weight loss

LDEX Analysis: We identified 33 patients tracked with bioimpedance data prior to the first surgical intervention. Among these 33 patients, LDEX scores decreased in 72.7% (24/33) of patients and increased in 27.3% (9/33) prior to surgery. For the 24 patients with successful optimization of lymphedema control before surgery, the mean and median decrease in LDEX scores was 26.1 and 19.2,

respectively. For the 9 patients with worsening lymphedema before surgery, the mean and median increase in LDEx scores was 12.8 and 9.8, respectively.

Limb Volume Perometry: We identified 23 patients tracked with limb volume perometry prior to the first surgical intervention. Among these 23 patients, differences between limb volumes decreased in 69.6% (16/23) of patients and increased in 30.4% (7/23) prior to surgery. For the 16 patients with successful optimization of lymphedema control before surgery, the mean and median absolute decrease in limb volume differences was 11.2% and 6.9%, respectively. For the 7 patients with worsening lymphedema before surgery, the mean and median absolute increase in limb volume differences was 7.2% and 8.1%, respectively.

Lymphedema Quality of Life (LQOL): We identified 19 patients tracked with the LQOL survey prior to the first surgical intervention (6 upper extremity, 13 lower extremity). For upper extremity patients, the overall, function, appearance, symptom, and mood scores changed by an average of +0.17, -0.11, -0.27, -0.41, and -0.14, respectively. For lower extremity patients, the overall, function, appearance, symptom, and mood scores changed by an average of -0.62, -0.34, +0.11, -0.35, and -0.03, respectively.

Conclusion:

Use of a multidisciplinary team for evaluating patients with lymphedema offers expertise in clinical evaluation, lymphatic imaging, and both conservative and surgical management. Among patients with bioimpedance and limb perometry data to track conservative management for preoperative optimization, improvements were seen in 72.7% and 69.6% of lymphedema patients, respectively. Given that less than 10% of patients evaluated at our center ultimately receive surgery, providing robust and non-invasive treatment options is essential. Comprehensive Centers of Excellence should consider reporting on both baseline measures as well as final preoperative measures with standard assessment tools to clarify the role and benefit of therapy and conservative optimization.

09. DRUG THERAPY, PHYSICAL TREATMENTS & ADJUVANTS FOR LYMPHEDEMA

INTERMITTENT PNEUMATIC COMPRESSION ADDED TO DECONGESTIVE THERAPY IMPROVES OUTCOMES BEFORE LYMPHATIC SURGERY FOR LOWER LIMB LYMPHEDEMA: A PILOT STUDY

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INTERMITTENT PNEUMATIC COMPRESSION IMPROVES OUTCOMES BEFORE LYMPHATIC SURGERY FOR LOWER LIMB LYMPHEDEMA: A PILOT STUDY

This study assesses the impact of an advanced intermittent pneumatic compression device (IPC - Lympha Press® Optimal Plus) on volume reduction of lymphedema limbs when added to Complete Decongestive Therapy (CDT), compared to CDT alone, in preparation for microsurgery (Multiple Lymphatic-Venous Anastomosis - MLVA), with the goal of maximally reducing edema in preparation for surgery. 50 subjects scheduled for MLVA were randomly assigned to experimental or control group: 25 (21 females and 4 males) in the experimental IPC group and 25 (20 females and 5 males) in the control group. The two groups were similar in age (mean IPC vs. control age: 47.2 years vs. 42.8 years ($p=0.6652$), sex distribution ($p=1$), and type of lymphoedema ($p=1$). With regard to proportional final vs. initial limb volume, the IPC group reported greater volume loss than the control group ($p=0.00137$). The average percentage edema volume loss achieved with added IPC was two times greater (11.7%) than in the control group (5.0%). When differences in treatment duration were accounted for, the IPC group achieved consistently greater proportional volume loss (12.83% vs 6.30%) than conservative therapy alone. IPC added to CDT resulted in greater proportional volume loss, hence provided better preparation for MLVA surgery.

09. Drug Therapy, Physical Treatments & Adjuvants for Lymphedema

The effect of clinical pilates exercises on pain, quality of life, depression and aerobic capacity in the treatment of secondary lymphedema

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The effect of clinical pilates exercises on pain, quality of life, depression and aerobic capacity in the treatment of secondary lymphedema

Purpose: The aim of this study was to investigate the effect of clinical pilates exercises combined with complex decongestive therapy (CDT) on pain, physical activity, depression, quality of life, aerobic capacity and posture in the treatment of upper extremity lymph edema secondary to breast cancer.

Material and Method: Twenty-two patients with secondary lymphedema were included in the study. Patients were randomly divided into 2 groups as clinical pilates group (CPG) and control group (CG). Both groups received CDT program for 3 weeks, 5 days a week. For CPG, in addition to CDT, group sessions with clinical pilates exercises were performed every other day, 3 days a week. Edema assessment was performed by circumferential measurement. Pain intensity was assessed by Visual Analog Scale (VAS), quality of life by SF-36 and Quick Questionnaire for Shoulder and Hand Disability (QDASH), depression by Beck Depression Scale (BDS), posture by New York Posture Analysis Method of the Body (NYPAY), physical activity by International Physical Activity Assessment Questionnaire, and aerobic capacity by 6-minute walking test. All evaluations were performed before and after treatment.

Findings: The mean age and body mass index of the groups were similar ($p>0.05$). In the pretreatment evaluation, all parameters except NYPAY were similar between the groups ($p>0.05$). Pre- and post-treatment pain, feeling of fullness, depression, NYPAY, QDASH parameters and all subgroups of SF-36 showed improvement in both groups ($p<0.05$), and significant improvement was

found in favor of CPG in intergroup comparison ($p < 0.05$). 6DYT was significantly increased only in CPG ($p < 0.05$) but there was no significant difference between the groups ($p > 0.05$).

Conclusion: In patients with upper extremity lymphedema due to breast cancer, the effects of clinical pilates exercises combined with CDT on pain, physical activity, mood, quality of life and posture are more effective than standard CDT. However, there is no significant difference between them in terms of aerobic capacity.

10. Exercise & Lymphedema: Advanced Technologies

Resistance training in secondary lymphoedema patients. Does it have any effect on functional and quality of life measures?

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Resistance training in secondary lymphoedema patients. Does it have any effect on functional and quality of life measures?

BACKGROUND:

Lymphoedema can be described as a chronic lymphatic disease that results in an abnormal accumulation of protein-rich fluid in the interstitial space in one or more parts of the body that have damaged nearby lymph nodes or vessels (Lyons and Modarai, 2019). The most common cause of lymphoedema in the upper limbs (UL) is a side effect of breast cancer and its treatment and affects up to 49% of this population (Gillespie et al., 2018; Liu, Y.-f. et al., 2021). Breast Cancer Related Lymphoedema (BCRL) can cause pain, discomfort, heaviness, tightness, distortion and reduced mobility and function of the affected limb (Hormes et al., 2010), and these symptoms heavily impact self-image, while also increasing anxiety, possible depression and frustration (Fu, Mei R. and Kang, 2013) affecting the psychosocial function and the QoL of patients (Vassard et al., 2010). The consensus is to advise patients to maintain an active lifestyle however there are limited guidelines on what types of activities may be beneficial or not (Lane, Worsley and McKenzie, 2005).

PURPOSE

The study was conducted to investigate whether resisted exercise programs are safe and beneficial to BCRL patients, and how this affects their function and QoL.

METHODS

The study investigated the safety and effectiveness of adding a moderate/high intensity resisted exercise (RE) program for 6 weeks on arm circumference, muscular strength, and quality of life (QoL) measure including function, appearance, symptoms, and mood in patients with BCRL. This study included thirty-five patients with a history of breast cancer who were in phase two of their lymphoedema rehabilitation. They were assigned to either the intervention (n=18) or control (n=17) groups. The intervention consisted of resistance band exercises 4 times a week for 6 weeks. These were performed independently and unsupervised during the study period using pre-recorded exercise programs. Limb circumference measurements, muscular strength, Disabilities of Arm, Shoulder, and Hand (DASH), Lower Extremity Functional Scale (LEFS) and Lymphoedema Quality of Life (LYMQOL) questionnaires were administered at baseline and at 6 weeks.

RESULTS

After 6 weeks, the intervention group demonstrated statistically significant improvements ($p<0.01$) in the DASH and LYMQOL scores. There was a significant change in UL and LL strength between both groups ($p<0.05$). Unexpectedly, there was a significant decrease in UL measurements in the hand, forearm, elbow, and proximal arm in the intervention group ($p<0.05$).

CONCLUSIONS

The results indicate that RE demonstrates a positive effect on arm function, symptoms and QoL without increasing arm volume in breast cancer-related lymphedema. Future work should assess longer term effects of such exercise. It could also assess whether RE can be performed without compression garments or whether RE can decrease the reliance of compression garments following lymphoedema diagnosis.

IMPLICATIONS

This study offers a safe and structured exercise program for specialists, physiotherapists, and lymphologists to be recommended to women with lymphoedema. It gives reassurance that after a stable lymphoedema status, patients with BCRL can engage in resisted exercise without risk of increased lymphoedema in the affected arm.

KEYWORDS:

#lymphoedema #resistedexercise #qualityoflife

FUNDING

This study was not funded by any organisation.

ETHICAL APPROVAL

The study was approved by REACH (EP 20/21 103) within the University of Bath, UK and by the Russian Lymphology Association where the study was conducted.

INFORMATION ABOUT THE WORK

The study was in part fulfilment for a Master's Degree in Physiotherapy at the University of Bath, United Kingdom.

10. Exercise & Lymphedema: Advanced Technologies

Virtual Reality-Based Training in Breast Cancer-Related Lymphedema Rehabilitation: A Narrative Review of Literature

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Virtual Reality-Based Training in Breast Cancer-Related Lymphedema Rehabilitation: A Narrative Review of Literature

Background: Breast cancer-related lymphedema is a (BCRL) common form of secondary lymphedema. In BCRL, physical function impairment may be observed due to symptoms such as pain, numbness, loss of muscle strength and range of motion, tension, heaviness, cellulitis, and infection in the affected extremity. The use of technology in rehabilitation has recently become widespread, popular, and attractive. Virtual reality (VR) is a computer generated graphical environment that offers opportunities for users to view and interact with the virtual environment. VR is a therapeutic option for improving functional capacity, especially in upper extremity rehabilitation. Reliable exercise selection in lymphedema rehabilitation is an important step of rehabilitation. VR may be used to improve lymphedema-related upper extremity symptoms in patients with BCRL. The aim of this research is to determine the effects of VR-based training in patients with BCRL.

Methods: It was searched in the PubMed database with the keywords "virtual reality" AND "lymphedema" OR "virtual reality" AND "breast cancer related lymphedema" until March 2023. Randomized studies in English were reviewed.

Results: Initially, two authors (GK, HK) concurrently screened 11 records by keywords. These studies were evaluated according to the title, abstract, and full-text analysis, respectively. The remaining three studies are summarized as following:

The first study was carried out by Atef et al. in 2020. The purpose of this study was to compare VR-based training and proprioceptive neuromuscular facilitation (PNF) in improving lymphedema and upper extremity function in BCRL patients. While manual lymphatic drainage, pneumatic compression, and home program were applied to both groups, VR-based exercise was performed in the VR group and PNF exercises were performed in the PNF group. Both groups showed improvement in both edema and upper extremity function, but there was no difference between the groups.

The second study was conducted by Sayed et al. in 2022. The aim of this study is to compare the effects between Wii fit balance board and core stability exercises on balance dysfunction in patients with unilateral BCRL. The Wii fit balance exercises and core stability exercises were applied three times per week for four weeks as the total treatment duration. As a result of the study, it was reported that Wii fit balance exercises were more effective in improving balance than core stability exercises.

The third study was carried out by Basha et al. in 2022. The objective of this study compare the effects of VR training and resistance exercises training on lymphedema symptom severity, physical functioning and quality of life in women with BCRL. In addition to complex decongestive physiotherapy, one group received VR Kinect-based games and the other group received resistance exercise training for five sessions per week for 8 weeks. The VR training was superior to resistance exercises training in BCRL management.

Conclusion: VR-based training is a new, efficient, and beneficial exercise method in BCRL rehabilitation. However, randomized controlled studies with similar methodology are needed to show the level of evidence.

10. Exercise & Lymphedema: Advanced Technologies

The Role of Aquatic Therapy in Lymphedema Rehabilitation

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The Role of Aquatic Therapy in Lymphedema Rehabilitation

Lymphedema is chronic, progressive swelling due to an insufficiency of the lymphatic system, characterized by accumulation of lymphatic fluid and proteins in the interstitial space. Lymphedema may be primary or secondary depending on the cause. There is no curative and standardized treatment program for lymphedema. Individuals with lymphedema need to perform a safe type of exercise to decrease lymphedema volume, enhance muscle strength, maintain mobility, reduce their body weight, and improve their quality of life. Aquatic therapy can be used both as a part of complex decongestive therapy and to maintain the physical activity level of lymphedema patients in the conservative treatment of lymphedema as a type of exercise. Aquatic therapy has benefits such as reducing edema, fatigue, anxiety, and depression and increasing physical capacity for people with lymphedema. The mechanism of aquatic therapy is based on the principles of hydrostatic pressure, activating the muscle pump, and the massage effect of water, making it safer and easier to do than the exercises done on land, due to the buoyancy.

There are studies in the literature evaluating the effects of aquatic therapy on people with lymphedema. There is a terminological inconsistency about 'aquatic therapy' in these studies. The terms used in the studies were: aqua-lymphatic therapy, water based exercise, aquatic physical therapy, aquatic therapy, Ai-Chi, aquatic physiotherapy, aqua therapy exercises, aquatic therapeutic exercise, and aquatic exercise. Aquatic therapy sessions were given a depth of 1-1.5 meters and at a water temperature of 28-34 °C. In the study protocols, the duration of treatment session varied between 30-60 minutes, while the frequency of treatment varied

between 1-3 per week. In addition we also observed that, the intervention period changed between 6 weeks and 12 weeks.

Aquatic therapy is a type of exercise recommended in 2020 Consensus Document of the International Society of Lymphology, but studies of its effects in lymphedema patients are limited. We think that it is important to use the terms 'aquatic therapy' or 'water based exercise' specified in the consensus in order to avoid terminological inconsistencies in future studies on this issue. In addition, the use of a specific treatment protocol will pave the way for meta-analysis studies that will show the effects of aquatic therapy. Aquatic therapy can be an effective exercise method for the rehabilitation of lymphedema patients. However, high-quality and randomized controlled studies are needed in this area.

10. Exercise & Lymphedema: Advanced Technologies

Comparison of Complete Decongestive Therapy versus Complete Decongestive Therapy+Bicycle Ergometer in the Treatment of Gynecological Cancer Related Lower Limb Lymphedema: A Randomized Clinical Trial

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Introduction: This study aimed to compare the effectiveness of complete decongestive therapy (CDT) versus CDT+Bicycle ergometer on limb volume, functionality and quality of life (QOL) in patients with lower limb lymphedema (LLL) related to gynecological cancers.

Methods: This prospective randomized study included 60 (30 unilateral LLL, 30 bilateral LLL) consecutive women patients with LLL related to a gynecological cancer. Demographical and clinical data of patients were noted.

The patients were randomly assigned to receive CDT (15 unilateral LLL, 15 bilateral LLL) or CDT+Bicycle Ergometer (15 unilateral LLL, 15 bilateral LLL) using closed envelope method. The treatments lasted 3 weeks in both groups. Pre-treatment and post-treatment measurements were made in both treatment groups. Comparison between differences in post-treatment and pre-treatment values between CDT and CDT+Bicycle ergometer treatment groups were made separately in patients with unilateral LLL and in patients with bilateral LLL.

CDT consisted of skin-care, manual lymphatic drainage, multilayer bandaging, remedial exercises and patient education for 5 days a week for a total of 3 weeks.

CDT+Bicycle Ergometer group received CDT plus Bicycle Ergometer treatment protocol for 5 days a week for a total of 3 weeks. All patients completed treatment protocols.

Lower extremity bicycle ergometry exercise was applied with Voit AT-200 Black Collection Recumbent Bicycle with pulse control. In this protocol, a warm up period of 10 minutes including whole-body mobilization exercises was followed by a 20 minute active lower extremity cycling ergometry exercise equivalent to 11 points on the Borg scale with a maximum heart rate of 40-59%, the protocol was finalized with a 10 minutes cool-down period of static stretching exercises.

The circumferential measurements were performed by a standard 1 inch retractable tape at 4-cm intervals along the leg, from malleoli to groin and converted to an approximate leg volume using the truncated cone formula to enable estimation of volume.

QOL was evaluated using the Lymphedema Quality of Life Questionnaire-Leg (LYMQOL-Leg), a 20-item validated disease-specific QOL tool, administered at Day 0 and again at study completion. The version of the LYMQOL used in this study specific to the lower extremity and includes an “overall QOL” question (scored 1–10, with a higher score reflecting better QOL), an aggregated total LYMQOL score, and four subscales: Symptoms (pain, swelling, and numbness), Body Image/Appearance, Function (activities of daily living such as eating, writing, and dressing), and Mood (sleep disruption, depression, and irritability).

Results: Median age of patients were 61 (56.5-63) (25%-75% interquartile range) years. Median LLL duration was 36 (10-55) (25%-75% interquartile range) months. Lymphedema volume significantly reduced in CDT+Bicycle ergometer and CDT treatment groups both in patients with unilateral LLL and in patients with bilateral LLL.

Volume reduction was significantly higher in CDT+Bicycle Ergometer than CDT both in patients with unilateral LLL and bilateral LLL (20.8% vs 12.1%, $p=0.002$; 14.7% vs 9.1%, $p=0.003$, respectively).

Significant improvements after treatments were found in all domains of LYMQOL-Leg scale both in CDT and CDT+Bicycle ergometer groups both in patients with unilateral LLL and in patients with bilateral LLL.

Then LYMQOL-Leg scale scores were compared between CDT and CDT+Bicycle ergometer groups both in patients with unilateral LLL and in patients with bilateral LLL.

CDT+Bicycle ergometer group had significantly higher improvements in function, appearance, symptom, mood, overall domains of LYMQOL-Leg scale both in patients with unilateral LLL and in patients with bilateral LLL.

Conclusion: Both CDT and CDT+ Bicycle ergometer treatments were effective in treatment of gynecological cancer related LLL. The results showed CDT+Bicycle ergometer was superior to CDT in the treatment of gynecologic cancer related LLL. Appropriate aerobic exercise regimens should be added to conventional treatments in the management of lymphedema.

10. Exercise & Lymphedema: Advanced Technologies

Development and improvements in the use of Biocircuit in the surgical treatment and multidisciplinary of lymphedema

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Development and improvements in the use of Biocircuit in the surgical treatment and multidisciplinary of lymphedema:

The aim of this study is to reduce the Lym. in patients through standardized physical activity.

This study was conducted with the collaboration of a world leader company in fitness equipment.

The path's name is Biocircuit, a standardized circuit of about 60 min that is repeated everyday for about 5 days. The patient will also be able to train in a generic gym thanks to a bracelet that can track his results. To create the training for the patient, all the decisions about the training duration and the right equipment were taken in collaboration between the lymphedema specialist doctor and the supply company. The physical training must be always done in elastic compression of class II, III or tailored with flat knit in patients from 18 to 60 years old.

This circuit is a low intensity workout, with both aerobic and anaerobic exercises, in order to stimulate the deep lymphatic system without hurting and/or overloading the patient.

To better track the results we used an optoelectronic perometer that is able to measure the volume of affected limbs. A Combined Physical Therapy (CPT) was included. This activity includes the following: mechanical lymphatic drainage and functional multilayer lymphatic bandage. CPT and the biocircuit are carried out to prepare the patient for surgical treatment and post surgical treatment. There were improvements from 2021 to date, thanks to periodical checks from our team. We will continue in patients monitoring until the 5th year of follow-up, according to protocol.

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