

Aquatic exercise training and lymphedema

The creation and studied benefits of an aquatic gym How training in water benefits the body

By Andrée Dionne

Introduction

Exercise has been recognised as an essential element in the management of lymphedema¹. However, restricted joint activity, reduced mobility, comorbidities and musculoskeletal pathologies are complications of lymphedema that limit participation in physical activity. In fact, the physical ability and psychological readiness to exercise may be impaired by being physically deconditioned, having comorbidities or musculoskeletal pathologies. Furthermore, recent research has shown that water exercise is safe for cardiac patients and does not affect the respiratory system^{2,3}.

To explore the physical characteristics of water and overcome the physical and medical limitations encountered on dry land an immersed training center called *Gym liquide* was created at UQAM. At this facility there are bikes, treadmills, steps, trampolines, floating boards, aquapoles, training cage, boxing bags and fit-lights for neuro muscular training. People of all ages and fitness levels train together. It's a personal valorization for people to discover their ability to move and coexist in the pool and use the same equipment as everybody else: a fitness enthusiast searching for a fresh new challenge, a pro athlete looking for a competitive edge or a person struggling with simple daily movement. Since training in water offers the experience



of less gravity, a better coordination, a multidirectional resistance, less fatigue, less pain and natural compression, it seemed like the perfect environment for participants with lymphedema.

Aquatic exercise intervention

Participants exercised for 45 minutes, twice a week for six weeks. The warm-up included yoga breathing, arm exercises and aqua-jogging in deep water. Afterwards, a circuit training session of moderate



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- 1 Gym Liquide Group Rehabilitation
- 2 Aqua-training
- 3 Lympho-yoga breathing
- 4 Lympho step
- 5 Lympho-aqua-spinning

Muscular exercises were performed on an aquastep and a trampoline to stimulate muscle pumps of feet and ankles.

to vigorous intensity interval training consisted of aqua-spinning, walking, arm and leg exercises immersed in chest deep water level. Muscular exercises were performed on an aquastep and a trampoline to stimulate muscle pumps of feet and ankles. This type of exercise plays a fundamental role in the management of edema of the lower limbs by stimulating reabsorption of fluid and venous hemodynamics⁴. For the cool down, participants returned to neck deep water level for aqua-jogging, arm exercises and yoga breathing. The water temperature was intentionally at 29°C, which is typically found in public pools, so that participants can pursue

training in their backyard pool, in a public pool, in a lake or at the hotel while they are vacationing. Kinesiologists, who are Klose certified CLT therapists, adapted the difficulty, the intensity and the progression of exercises according to the ability to exercise, the fitness and medical condition of each participant.

Outcome measures were *Quality of Life for Limb Lymphoedema Questionnaire* (LYMQOL), handgrip strength test, bioelectrical impedance spectroscopy (BIS), circumference measures of the affected limb⁵ and the 6-minute walk test (6MWT)⁶.

This innovative aquatic exercise training program allows moderate and vigorous intensity activities for patients with lower leg lymphedema, as recommended by major cancer organizations and the ACSM (American College of Sports Medicine). Water immersion approaches such as, the aquatic lymphatic therapy, known as the Tidhar method, is mostly recognized as being low intensity, based on Casley-Smith remedial exercises⁷.

The ACSM recommended exercise prescription is:

- 150 min. per week of moderate intensity or 75 min. per week of vigorous intensity aerobic exercise or an equivalent combination;
- 2 to 3 weekly sessions of muscle-strengthening and flexibility exercises for major muscle groups.



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The exercise prescription must be adapted according to health status, treatments received, and anticipated disease trajectory of each participant. Walking on dry land may not be physiologically strenuous enough to constitute moderate or vigorous intensity aerobic exercise and the fear of falling can also be a preoccupation when trying to walk faster. Walking or jogging in the water allows an increase in exercise intensity with minimal joint impact and risk of falling. A 70 kg person weighs only 7 kg when immersed at neck deep water level.

Eleven participants were recruited to participate and four declined to pursue the study for personal reasons. With only 90 minutes per week of aquatic training, the participants in the current study, were able to significantly decrease limb circumferential volume ($p=0.03$) and global extracellular fluid ($p=0.04$) and to significantly increase their functional capacity as shown by the improvement in handgrip strength ($p=0.003$) and the 13% increase in the distance covered

in the 6MWT ($p=0.04$). Handgrip strength has been recognised as a valid measurement of mobility and quality of life in patients and of physical activity in healthy subjects⁸. A trend towards an increase in the overall quality of life score and the significantly improved emotions score ($p=0.03$) with the LYMQOL were observed after only 6 weeks of training suggesting that aquatic exercise may help manage the disease burden as an added tool to improve physiological, physical and psychological factors that affect survival and quality of life of cancer patients⁹. In absence of treatment, lymphedema may progress and exercise may play an important role in preventing progression¹. The high adherence (100%) and compliance rate ($88 \pm 9\%$) in this program is of importance to form an effective long-term treatment strategy for lymphedema. Immersion exercise does not appear to exacerbate LLL and a randomized clinical trial with larger numbers is essential to consolidate the results of this study. 

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This article is a synopsis of a pilot study carried out at the University of Québec in Montréal (UQAM) and published in The Journal of Alternative and Complementary Medicine (JACM) titled "Aquatic exercise training outcomes on functional capacity, quality of life and lower limb lymphedema". To view the full article and all of the results: J Altern Complement Med. 2018 Sep/Oct;24(9-10):1007-1009. doi: 10.1089/acm.2018.0041. <https://www.ncbi.nlm.nih.gov/pubmed/30247973>

A full set of references can be found at www.lymphedemapathways.ca



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