

TOPIC: EXERCISE

Fitness and Exercise:

It is very important for individuals with lymphedema to be physically fit and maintain a healthy weight. A safe form of exercise is an essential part of a fitness program for people with lymphedema. Fitness and exercise are not the same. Exercise includes many different types of physical movement. The three main types of exercise are: aerobic, strength, and flexibility. These three types of exercise, along with Lymphedema Remedial Exercises, are addressed in this paper. There are many other types of exercise that have health benefits such as Pilates, yoga, Tai Chi, Qi-gong, aquatic exercise,^{1,2} trampoline rebounding, breathing exercises,³ and relaxation exercise that have not been adequately studied in people with lymphedema. However, the person with lymphedema can use the benefits of any system of exercise if he/she follows the general safety principles of exercise with lymphedema, seeks medical guidance, and uses caution in starting any new exercise program.

Exercise and types of lymphedema:

Lymphedema has many causes. The type of exercise that is best for an individual depends upon the severity and cause of lymphedema and other co-existing medical conditions (e.g. heart disease, diabetes, arthritis, etc). Exercise for breast cancer-related lymphedema is the most studied lymphedema condition. Many conclusions about exercise and lymphedema are based on studies of breast cancer survivors that may or may not apply to other forms of lymphedema.

A systematic review of the literature on exercise in patients with lymphedema was completed in 2011 by the American Lymphedema Framework Project (ALFP).⁴ The systematic review included 35 articles pulled from 11 major medical indices between the years of 2004-2010. Results indicated that exercise in the majority of patients were safe but to confirm these findings larger, more rigorous studies needed to be completed. The findings indicate under medical supervision it appears to be safe to exercise throughout the course of care for breast cancer.

Lymphedema Remedial Exercise:

Lymphedema Remedial Exercise is a part of treatment for lymphedema when reduction of size of a limb is necessary. Lymphedema Remedial Exercise involves active, repetitive, non-resistive motion of the involved body part. Exercise in Phase I and Phase II Complete Decongestive Therapy (CDT) (see Position Paper "Diagnosis and Treatment of Lymphedema" (www.lymphnet.org/pdfDocs/nlntreatment.pdf) is performed with compression as an essential part of the total (complete) reductive phase of lymphedema therapy.⁵⁻⁷ Lymphedema exercises, used with compression, help the body's natural muscle pump to increase venous and lymphatic fluid return to the circulatory system and out of the swollen areas. Remedial Exercises for lymphedema are similar to some movements of low impact Tai Chi and Qigong, but are different in that lymphedema Remedial Exercise is used with Phase I treatment of lymphedema to reduce size of the body part. Lymphedema Remedial Exercise has been studied and shown to reduce limb swelling.⁵⁻⁷ It is unknown whether Lymphedema Remedial Exercise alone can prevent lymphedema in at-risk individuals, or whether they can maintain reduction of swelling without compression.

Flexibility or Stretching Exercises:

Flexibility exercises include a wide range of activities that stretch muscle and connective tissues to increase and/or preserve range of motion. Flexibility exercises can minimize skin scarring and joint contractures that may lessen

lymph flow. Flexibility exercises should be performed slowly and progressed gradually. Flexibility exercises are not a treatment for lymphedema, but are a part of optimal lifestyle management for reducing the complications of lymphedema. Lymphedema has a tendency to restrict motion of muscles and joints. Optimal lymphatic function requires full mobility of muscles and joints. Lymphedema from cancer treatment can be associated with tight muscles and connective tissues due to fibrous adhesions from surgery or radiation. Tight muscles and scars from surgery or radiation may require Physical or Occupational Therapy to treat before attempting to do self-stretching. Specific stretching exercises for cancer treatment-related scars and joint restrictions in an area at risk of lymphedema should be prescribed by a provider familiar with the management of lymphedema. A specialized form of stretching exercise may be required for Axillary Web Syndrome (AWS) or axillary/upper extremity cording, a condition that can occur in cancer survivors who have had axillary (armpit) lymph nodes removed.⁸ AWS may benefit from treatment by a certified lymphedema therapist and specific home stretches taught by a therapist.⁹

Resistance or Weight-Lifting Exercise:

Resistance exercises are usually thought of as weight-lifting. Resistance exercises may involve lifting body weight (such as push-ups) or lifting objects (such as dumbbells, weight machines, etc). Resistance exercises can be performed without moving a joint (isometric) or by moving the joint through a range of motion (isotonic). All of these types of resistance exercise may be utilized by individuals with lymphedema, but should be done cautiously, starting with low weights, low repetitions, and gradual progression.¹⁰ Resistance exercises are performed against an opposing load to enhance muscle power, stamina, and tone. Resistance exercise may reduce limb volume when used as an adjunct to compression therapy.^{11,12} One study showed that guided participation in resistance exercise, as a part of a total fitness program, did not increase the risk of developing lymphedema in breast cancer patients at risk over the group who did not exercise.¹³ Lymphedema did occur in both groups. No increase in lymphedema development was noted between the exercise and the non-exercise group. There have been many studies on resistance exercise in breast cancer-related lymphedema that show no harmful effect on lymphedema and beneficial effects for overall health.^{4,14-24}

Aerobic Conditioning or Cardiopulmonary Exercise:

Aerobic conditioning exercise is often referred to as “cardio” exercise. Aerobic exercise involves activity that uses large muscle groups to increase the heart rate to 60-70% of an individual’s maximum heart rate. This type of exercise, when progressed gradually, increases the heart and lung capacity while also improving muscle conditioning. Aerobic conditioning enhances cardiovascular fitness, effective weight management, and overall health and well-being, all of which are very beneficial to people with lymphedema from all causes.^{4,14-23,25} Walking, jogging, cycling, and swimming are examples of aerobic conditioning exercise. Aerobic conditioning has not been studied formally as a treatment for lymphedema. One study showed no adverse effect on lymphedema from aerobic exercise.²⁰

Resistance Exercise plus Aerobic Exercise:

Studies of combined resistance and aerobic exercise have shown no adverse effects on lymphedema.²⁵ No studies have specifically evaluated resistance plus aerobic exercise as a stand-alone treatment for lymphedema. One study in breast cancer-related lymphedema showed that the individuals who performed aerobic conditioning and weight lifting had better control of their lymphedema and had fewer flares of lymphedema than those who did not exercise. However, individuals with lymphedema still had to utilize standard lymphedema therapy techniques for flares.²⁵ Another study about women at risk for breast cancer-related lymphedema showed that aerobic conditioning and weight-lifting reduced the risk of developing lymphedema.

Considerations for Designing an Exercise Program:

A number of studies have shown that aerobic and resistance exercises are safe and beneficial for people with lymphedema or at risk of lymphedema if they follow the guidelines for progressing slowly, use recommended compression, and report any adverse effects to a professional who can help them adapt their exercise regimen.^{4,13,20-23,25-27} Most studies on lymphedema and exercise have been done on breast cancer survivors, but the principles

may guide exercise in other forms of lymphedema. Individuals with or at risk of lymphedema must report other health conditions that need to be considered in developing a personal exercise regimen (diabetes, heart disease, neuropathy, arthritis, etc). Modifications of aerobic and resistance exercise that are commonly recommended for individuals with lymphedema are: 1) Allowing adequate rest intervals between sets; 2) Avoiding weights that wrap tightly around an extremity or clothing that cause constriction; 3) Wearing compression sleeves or bandages during exercise; 4) Maintaining hydration; 5) Avoiding extreme heat or overheating; 6) Exercising in a circuit that alters the type of exercise and body part within the exercise session.

Exercise and Compression Garments:

Lymphedema Remedial Exercise as a part of CDT requires compression garments or bandages.⁵⁻⁷ There are no studies on the use of compression garments when performing stretching or flexibility exercise alone. The NLN Medical Advisory Committee (MAC) recommends using the guidelines for aerobic and resistance exercise to guide use of compression during flexibility exercise since flexibility exercises may be combined with other forms of exercise. The amount and type of compression for exercise should be decided with input from a professional knowledgeable about lymphedema. There is no strong evidence basis for the use of compression garments during exercise; however, most experts in the field of lymphedema advise the use of compression during vigorous exercise for people with a confirmed diagnosis of lymphedema. One study suggested that individuals with lymphedema who do resistance exercise without compression may increase swelling²³ Resistance exercise may reduce limb volume when used as an adjunct to compression therapy in people with confirmed lymphedema.⁸ One study showed that aerobic and weight-lifting exercise was safely performed without compression in women at risk for breast cancer-related lymphedema.¹³ That study showed patients who developed lymphedema could continue to exercise with compression garments. Compression garments should be measured by an individual trained and experienced in fitting compression garments for lymphedema and should be at least Class I compression for upper extremity. Higher classes may be required for more severe lymphedema and for lower extremity lymphedema. A hand piece (gauntlet or glove) is recommended when exercising with a sleeve to avoid causing or exacerbating hand swelling.

Definition of Individuals At Risk for Lymphedema:

Individuals at risk for lymphedema have not displayed signs and symptoms of lymphedema but may have sustained damage to their lymphatic systems through surgical lymph node removal or radiation therapy. Additionally, individuals at risk may have surgical incisions in the vicinity of lymph transport vessels. Individuals who have family members with hereditary lymphedema may also be at risk. An individual's risk of lymphedema may change over time depending on factors such as weight gain, age, and changes in medical condition.

It is the position of the NLN that:

- Exercise is a part of a healthy lifestyle and is essential for effective lymphedema management
- Before starting any exercise program, individuals should be cleared for the program of activity by their physician.
- Lymphedema Exercises (also known as Remedial Exercises) are specific rhythmic muscle and breathing exercises used as a part of lymphedema treatment in Phase I and Phase II Complete Decongestive Therapy (see the NLN Position Paper on Diagnosis and Treatment). www.lymphnet.org/pdfDocs/nlntreatment.pdf In Phase II lymphedema maintenance, these exercises can be combined with or integrated into a regular exercise program.
- After intensive treatment with CDT, the person with lymphedema should work with the certified lymphedema therapist or qualified lymphedema specialist provider (MD, NP) to adapt their remedial exercises into their fitness and weight management program at the time they are moving from Phase I (treatment phase) to Phase II (self management).
- Individuals with or at risk for lymphedema can and should perform aerobic and resistance exercise in a safe manner.
- The individual with or at risk for lymphedema may benefit from working with an Exercise Physiologist and/or Personal Trainer. The person with lymphedema should inquire if the trainer or exercise physiologist has experience working with lymphedema and other medical conditions. Certification for personal trainers varies.

Patients who are unsure of about the qualifications of a community exercise practitioner should work with a certified lymphedema therapist or health care provider to assist them in finding a community exercise program or professional.

- In general, individuals with a confirmed diagnosis of lymphedema should utilize compression garments or compression bandages during exercise.
- Individuals at risk for lymphedema may or may not utilize compression garments during exercise; this is an individual decision to be made with guidance from a care provider and/or therapist based on risk, activity, and conditioning level.
- Individuals at risk for lymphedema will benefit from most forms of exercise tailored to their individual needs.
- Individuals at risk for or with a confirmed diagnosis of lymphedema should avoid repetitive overuse of the affected part. Sudden increase in an individual's usual exercise duration or intensity may trigger or worsen lymphedema. It is likely that a program of slowly progressive exercise for the affected body part will decrease the potential for common daily activities to result in overuse.
- Exercise should be started gradually, increased cautiously, and stopped for pain, increased swelling, or discomfort.

The risks of exercise for the individual with or at risk for lymphedema must be balanced against the risks of deconditioning that undoubtedly results from not exercising. A deconditioned body part with or at risk for lymphedema can do progressively less without risk of overuse. As a result, exercise is recommended for those with and at risk for lymphedema.

The NLN cannot specifically determine the safety of exercise for any individual. The guidelines in this Position Paper provide general principles, but do not substitute for medical evaluation and recommendations from a health care professional. It is the responsibility of all individuals with or at risk for lymphedema to consult with their health care provider regarding their own specific needs.

1. Tidhar D, Katz-Leurer M. Aqua lymphatic therapy in women who suffer from breast cancer treatment-related lymphedema: a randomized controlled study. *Support Care Cancer*. 2010;18: 383-392.
2. Johansson K, Hayes S, Speck RM, Schmitz KH. Water-based exercise for patients with chronic arm lymphedema: a randomized controlled pilot trial. *Am J Phys Med Rehabil*. 2013;92: 312-319.
3. Moseley AL, Piller NB, Carati CJ. The effect of gentle arm exercise and deep breathing on secondary arm lymphedema. *Lymphology*. 2005;38: 136-145.
4. Kwan ML, Cohn JC, Armer JM, Stewart BR, Cormier JN. Exercise in patients with lymphedema: a systematic review of the contemporary literature. *J Cancer Surviv*. 2011;5: 320-336.
5. Boris M, Weindorf S, Lasinkski S. Persistence of lymphedema reduction after noninvasive complex lymphedema therapy. *Oncology (Williston Park)*. 1997;11: 99-109; discussion 110, 113-104.
6. Földi E, Földi M, Weissleder H. Conservative treatment of lymphoedema of the limbs. *Angiology*. 1985;36: 171-180.
7. Földi M, Földi E, Kubik S. *Textbook of lymphology for physicians and lymphedema therapists*. Urgan & Fischer Verlag (Elsevier), 2003.
8. Bergmann A, Mendes VV, de Almeida Dias R, do Amaral ESB, da Costa Leite Ferreira MG, Fabro EA. Incidence and risk factors for axillary web syndrome after breast cancer surgery. *Breast Cancer Res Treat*. 2012;131: 987-992.
9. Fourie WJ, Robb KA. Physiotherapy management of axillary web syndrome following breast cancer treatment: discussing the use of soft tissue techniques. *Physiotherapy*. 2009;95: 314-320.
10. Kilbreath SL, Refshauge KM, Beith JM, et al. Upper limb progressive resistance training and stretching exercises

following surgery for early breast cancer: a randomized controlled trial. *Breast Cancer Res Treat.* 2012;133: 667-676.

11. Johansson K, Tibe K, Weibull A, Newton RC. Low intensity resistance exercise for breast cancer patients with arm lymphedema with or without compression sleeve. *Lymphology.* 2005;38: 167-180.
12. Cormie P, Pumpa K, Galvao DA, et al. Is it safe and efficacious for women with lymphedema secondary to breast cancer to lift heavy weights during exercise: a randomised controlled trial. *J Cancer Surviv.* 2013.
13. Schmitz KH, Ahmed RL, Troxel AB, et al. Weight lifting for women at risk for breast cancer-related lymphedema: a randomized trial. *JAMA.* 2010;304: 2699-2705.
14. Hayes SC, Janda M, Cornish B, Battistutta D, Newman B. Lymphedema after breast cancer: incidence, risk factors, and effect on upper body function. *J Clin Oncol.* 2008;26: 3536-3542.
15. Schmitz KH. Balancing lymphedema risk: exercise versus deconditioning for breast cancer survivors. *Exerc Sport Sci Rev.* 2010;38: 17-24.
16. Mustian KM, Sprod LK, Palesh OG, et al. Exercise for the management of side effects and quality of life among cancer survivors. *Curr Sports Med Rep.* 2009;8: 325-330.
17. van Weert E, Hoekstra-Weebers JE, May AM, Korstjens I, Ros WJ, van der Schans CP. The development of an evidence-based physical self-management rehabilitation programme for cancer survivors. *Patient Educ Couns.* 2008;71: 169-190.
18. Irwin ML, McTiernan A, Manson JE, et al. Physical activity and survival in postmenopausal women with breast cancer: results from the women's health initiative. *Cancer Prev Res (Phila).* 2011;4: 522-529.
19. Kendall AR, Mahue-Giangreco M, Carpenter CL, Ganz PA, Bernstein L. Influence of exercise activity on quality of life in long-term breast cancer survivors. *Qual Life Res.* 2005;14: 361-371.
20. Courneya KS, Segal RJ, Mackey JR, et al. Effects of aerobic and resistance exercise in breast cancer patients receiving adjuvant chemotherapy: a multicenter randomized controlled trial. *J Clin Oncol.* 2007;25: 4396-4404.
21. McKenzie DC, Kalda AL. Effect of upper extremity exercise on secondary lymphedema in breast cancer patients: a pilot study. *J Clin Oncol.* 2003;21: 463-466.
22. Turner J, Hayes S, Reul-Hirche H. Improving the physical status and quality of life of women treated for breast cancer: a pilot study of a structured exercise intervention. *J Surg Oncol.* 2004;86: 141-146.
23. Lane KN, Dolan LB, Worsley D, McKenzie DC. Upper extremity lymphatic function at rest and during exercise in breast cancer survivors with and without lymphedema compared with healthy controls. *J Appl Physiol.* 2007;103: 917-925.
24. Demark-Wahnefried W, Campbell KL, Hayes SC. Weight management and its role in breast cancer rehabilitation. *Cancer.* 2012;118: 2277-2287.
25. Schmitz KH, Ahmed RL, Troxel A, et al. Weight lifting in women with breast-cancer-related lymphedema. *N Engl J Med.* 2009;361: 664-673.
26. Brown JC, Troxel AB, Schmitz KH. Safety of weightlifting among women with or at risk for breast cancer-related lymphedema: musculoskeletal injuries and health care use in a weightlifting rehabilitation trial. *Oncologist.* 2012;17: 1120-1128.
27. Cavanaugh KM. Effects of early exercise on the development of lymphedema in patients with breast cancer treated with axillary lymph node dissection. *J Oncol Pract.* 2011;7: 89-93.

©2013 National Lymphedema Network (NLN). Permission to duplicate this handout as-is, in its entirety, for the educational purposes only, not for sale. All other rights reserved. For reprint permission, please contact the NLN office at 415-908-3681 or nln@lymphnet.org.