

Exercising with Lymphedema is a Balancing Act

Living with or preventing lymphedema is all about finding balance. This is true also for the role that exercise plays in managing lymphedema. An appropriate amount of exercise can help in the return of fluid due to the action of muscle contractions and deep breathing, which aid the lymph vessel system and the veins in their function. However, if more fluid is sent to the tissues than the lymph vessel system and veins can return then swelling can result. Therefore, each individual needs to find the balance point between too little and too much exercise for their own bodies. Obviously this will involve some trial and error as well as following general principles and guidelines. Watching and listening to the body will give valuable feedback to steer this course successfully.

Most training programs used by amateurs and professional athletes involve three components; flexibility, muscle strengthening and cardiorespiratory exercises. Sometimes training in these three areas takes place in one session or on separate days for each. This depends on the individual's goals, time availability and access to facilities.

Review of the Lymph Vessel System

The heart is constantly pumping nourishing blood to all the tissues. The lymph vessel system is responsible for returning 10% of this fluid back to the heart. The veins take care of the remaining 90%. When the lymph vessel system is damaged through removal of pathways (axial node dissection) or impairment in its functioning (radiation) or there are less pathways to begin with (primary lymphedema), then the fluid return function can be below what the body requires, resulting in swelling (edema). Since this swelling is due to the poor functioning of the lymph vessel system it is called lymphedema.

Flexibility

Surgery, radiation and stress all tend to tighten the tissues of the body. The fascia is a system of tissues that coats the muscles and organs of the body. These multi-layered tissues that are connected to each other attach to the base of the skull and chin and extend to the ends of the fingers and toes. This tissue is quite sensitive to scarring caused by surgery, the fibrosis caused by radiation and the stresses of every day life. Some lymph vessels go right through this fascia and others run alongside it. If it is

tight or pulling at an abnormal angle, these lymph vessels work less efficiently which can lead to swelling.

Therefore, flexibility exercises can work to keep the fascia and muscles less tight, thus enabling the existing lymph vessel system to work more effectively. For example, flexibility exercises to loosen the pectoral muscles on the chest can improve drainage from the lymph vessels in the armpits as well as the veins that drain the arms (Miller, 1998). These results could be achieved through Yoga, Tai Chi, Chi Kung, relaxation exercises or range of motion exercises. For these purposes, choose a form of Yoga that is gentle (see resources) and includes a relaxation component. Tai Chi and Chi Kung involve slow movements that produce a variety of effects including increased flexibility.

Relaxation exercises can be done in classes or through audiotapes or CD's. They may include diaphragmatic breathing, muscle relaxation and visualizations. For those that find daily stress to be a major factor in their body's general tightness, learning to release tension can prove invaluable (see Eli Bay in resources list).

Range of motion exercises are usually given to people after surgery. They involve moving joints through the normal ranges that they move through such as raising the arms up to the head forwards (wall walking) and sideways, bending the neck to each side and down to the chin. These can be used to regain and maintain flexibility after medical procedures or on a daily basis if no other exercises are being done (see resource list). They can indicate if

you are losing some range. Since they are not very interesting to do in the long term, going to a yoga or tai chi class may prove to be more motivating.

Muscle Strengthening (Resistance Training)

There have been a couple of small pilot studies done in Canada with women who participated in dragon boat racing after breast cancer treatments (McKenzie, 1998, McKenzie & Kalda, 2003). Mackenzie and Kalda (2003) found that women who participated in the exercise protocol of the study did not exacerbate their pre-existing lymphedema. All participants wore compression sleeves while they were part of the study. They did resistance training 3 days a week including stretching and an aerobic warm up. The training started with low weights, which were progressed as tolerated by the individual. From these studies came the popularity of dragon boat racing for cancer survivors. Dragon boat teams usually have training manuals for their members and an agreement to participate in a regular training program(including flexibility, resistance and cardio exercise) before racing. We have learned from dragon boat training that it is important to start with light resistance and increase slowly. If any swelling or pain is noticed after exercising then back up with reps or weights to a level that is pain and swelling free and after a week or so slowly increase again. This slow approach will ensure long term success.

Why is Training Important?

If a large workload is demanded from an untrained muscle several things could happen. The muscle could get strained with micro-tears to the muscle fibres. This could set up an inflammatory process that would increase fluid to the area, possibly resulting in swelling. Secondly, the heart would have to send a great deal of blood to the area to meet the muscles' need for oxygen and glucose, which could also result in swelling. Clinically we see this when someone with lymphedema or at risk for it goes to gym for the first time and enthusiastically overdoes it resulting in pain and swelling. Such people sometimes swear off exercise in the future based on this outcome. However, a properly trained muscle could do the same workload without strain or swelling.

Regular training enables the body to deliver oxygen more efficiently to the muscles (see box) thereby reducing the risk of swelling. The idea is to train the muscles, the heart and the lungs to work more efficiently.

If you want to strengthen muscles, train for dragon boat racing or participate in athletic events, it is best to commit to a regular training program and increase slowly and gradually while monitoring the body for signs of lymphedema, in order to attain the best results. A compression garment increases the external pressure on the tissues which makes it more difficult for fluid to stay in the limb. This increased pressure can aid the lymph vessel system in returning the extra fluid to the heart. However, a sleeve is not diplomatic immunity -- overdoing it

Physical Effects of Training

- Muscle fibers increase in size (not in number) and therefore are stronger and more resistant to strain and damage.
- Capillary bed density in trained muscle increases so there are more blood vessels per muscle fibre to deliver and take away blood thereby decreasing the likelihood of "flooding".
- Increased volume of air (tidal volume) with each breath increases available oxygen in lungs for blood to pick up resulting in up to 3X as much oxygen in the blood at maximum exercise.
- Increased respiratory rate increases amount of oxygen available.
- Increased (by 3X) ability of muscles to take oxygen from the blood.
- Increased efficiency of heart improves oxygen uptake from lungs.

can still lead to swelling. Muscle strengthening can be done at a gym or at home with machines or with free weights. For instance, start with a low weight and do 2 sets of 10 repetitions for a few weeks. Then increase to 3 sets of 10 reps. If this causes no pain or swelling, increase to a slightly higher weight at 2 sets of 10 reps and so on. Check after the exercise and at the end of the day

for swelling (see box) and even 24 hours later for pain or stiffness. At a gym, if you can't figure out the weights or if the machines respond to your strength as at Curves, then start off by using what feels like half of your strength and see how your body responds. Gradually increase the resistance you are using as your body allows. It is easier to correct any swelling or pain if it is a small amount. Pushing your body and overdoing it can take more time and work to correct and may be very discouraging to the participant. Another key to resistance training is to do interval training. This means to keep changing the area of the body you are working on throughout the program. For example, this may mean alternating legs and arms with each exercise. The Curves program is interval training.

Signs of Swelling

- Increased fluid in the tissues can feel like aching, increased tightness, heaviness.
- You may be able to see the swelling in areas such as the back of the hand or wrist.
- You may be able to see it in the back of the upper arms by raising bent arms up to your ears so that your upper arms frame your face as you look in the mirror.
- You can also gently squeeze your limb and compare the feeling of density (as you would when buying fruit) to the other side before and after exercising
- Measuring your arm may give you information in the long term but not necessarily with small daily changes.

Cardiorespiratory Training

Cardiorespiratory training can be done through a variety of activities such as walking, running, elliptical trainers, treadmills, biking etc. The goal is to increase the heart rate to train the heart muscle and to improve respiratory function. This type of training raises the heart rate and blood pressure, thus increasing the blood volume to the entire body. The working muscles will get the majority of the increase of this blood flow. Depending on the area of lymphedema, cardio training can be approached like resistance training with respect to swelling. Check which muscles are actually working during the training. For instance, hanging on tightly to handle bars of bikes or treadmills works the forearm muscles, thus increasing blood flow to the forearms. For this reason, wearing a compression garment on the arm is probably a good idea for cardio training as well. For leg lymphedema, a compression garment would be very important to wear. For those who want to participate in fund raising walks such as the 60 km walk in Toronto or even smaller ones, it is recommended that training be done beforehand and that compression garments used.

The long term effects of cardio training are that the person can do more exercise with a lower heart rate and blood pressure since the heart muscle is stronger and can work more efficiently. The lungs also become more efficient at delivering oxygen to the blood stream. The increased rate and depth of inspiration also stimulate the function of the thoracic duct and venous return, which could help the trunk

and lower extremities to decongest. Improved respiratory function can be very important after breast cancer treatments, which can restrict function through tight tissues or radiation damage. This means that the individual can respond to the challenges of life with less chance of disrupting the body's balance including the fluid balance that managing lymphedema depends on.

Swimming

Swimming is an excellent exercise for those with lymphedema. The pressure of the water on the limb acts like a compression sleeve. Gravity is eliminated as well making it easier for fluid to return to the heart. This makes it a good exercise for both upper and lower extremity lymphedema. It is particularly good for legs if there is any difficulty or pain associated with walking on land. Going to an accessible pool (with a ramp) is helpful if getting into the pool is an issue. Dorit Tidhar, a physiotherapist in Israeli came up with an innovative lymphedema exercise program in the water including self-massage (see resources). Doing self-massage (manual lymph drainage) is a good idea before and after exercise. This could be learned from health care professional trained in Combined Decongestive Therapy. Manual lymph drainage assists the lymph vessel system in functioning better and can be used to reroute fluid around underserved areas. This warms the system up before exercise so that it can cope better with the increased fluid load and helps the system to clean up any extra fluid when exercise is done.

Following intensive exercise, the blood vessels in the working muscle stay dilated or enlarged for a period of time after the exercise is finished (Cable, 1998). This maintains an increased blood flow to the area after exercise. Keeping the compression sleeve on for a while after exercising and doing self-massage could help the body to cope with this increase in fluid.

Heat

When the body gets hot the blood system responds by sending more blood to the hot area to pick up the heat and redistribute it to cooler areas. This is like the cooling system of a car. Exercising produces heat initially in the working muscles and eventually throughout the entire body. Activities that are done outside in the summer can also make the body hot. This causes more blood to flow to the hot areas which puts an additional load on the lymph vessel system which could lead to swelling. Therefore it is wise to do outside activities such as golf or running at cooler times of the day. Since the body stays hot for a while after exercising, the compression garment could be left on as well.

Overall Effects of exercise

- Improved flexibility allows lymph vessel system to function better.
- Improved muscle strength allows body to respond to every day demands while staying in balance
- Improved cardio function allows for less fluctuation of blood volumes thereby decreasing need for lymph vessel system to respond to “emergency floods”.

- Exercises such as walking decrease side effects of chemotherapy and radiation (Mock, et al, 2001).
- Improved mood and enjoyment of life.
- Allows one to participate in life more fully including household tasks and recreational activities.
- Reduced fatigue.

Listening to Your Body

Our North American culture may have created some wonderful things but a balanced approach to our bodies does not appear to be one of them. The zealous attention to the financial bottom line may create a “healthy” economy but our bodies are paying the price. We all know that if we don’t do oil changes and fill our cars with gas we won’t get too far. We all know that having virus protection for our computers is important. However many people resent spending time caring for their physical selves. It is not too hard to see how this attitude is developed in a climate of ignoring your needs for sleep, rest and eating properly because there is too much to do. Over time, we get adept at not hearing the body’s voice and more adept at avoiding it’s messages.

There are many ways to reconnect to the body. Getting the physical onto the priority list is a first step. Taking time to feel what is going on came help. Mindfulness meditation such as Jon Kabat Zinn’s approach structures the time to pay attention into the day (see resources). Self manual lymph drainage massage will give a heightened awareness and feedback

from the body. A CDT therapist could help one to interpret the body’s symptoms which could help in getting the message the body is sending. Re-learning the language of the body can be invaluable in making decisions around how much to exercise.

Getting Started

- Pick a type of exercise that you like – you are more likely to do it.
- Decide what your goals are and what is realistic for you – don’t guilt yourself.
- Anything is better than nothing so celebrate what you are achieving.
- Listen to your body -- it’s your best expert. Self-massage before and after exercising to increase the functioning of the lymph vessel system.
- Wear a compression garment while exercising.
- If you run into problems, consult a health care professional who understands exercise and lymphedema.
- Finally, enjoy the benefits that exercise can give you.

This article by Sharon Langfield and Janet McFarland is reprinted from the Lymphovenous News, Vol 8, No. 3 Fall 2005.

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Further Resources

Abreast In a Boat Team Manual – To find a Dragon Boat Team, you could go to www.abreastinaboat.com. Then go to Contacts/Links, then Teams around the world, then Canada.

Eli Bay's Relaxation Response Institute, 1352 Bathurst St., Suite 201, Toronto, ON. 416-932-2784 or toll-free 877-435-2971
www.elibay.com – classes, tapes, CD's, etc. on relaxation.

Breast Cancer Action – exercise sheets – basic Range of Motion and resistance program. Available from Breast Cancer Action, Ottawa: Info@bcaott.ca, www.bcaott.ca, (613) 736-5921.

Burt, J. & White, G. (1999). *Lymphedema: A Breast Cancer Patient's Guide to Prevention and Healing*. Hunter House Pub. – This book has pictures of flexibility and strengthening exercises that can be done after breast cancer surgery.

Jon Kabat Zinn has books such as *Full catastrophic living* and *Wherever you go, there you are* as well as CD's with guided meditations and exercises all dealing with Mindfulness Meditation. Some MD's are now running courses in Mindfulness Meditation as a stress reduction technique.

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Wellspring is a network of centres, which provide support for people living with cancer. It has locations in Toronto, Halton-Peel, London and Niagara. They offer free classes in Body Mind Meditation, Yoga, Tai Chi, Chi Kung, Relaxation. For more information www.wellspring.ca.

Yoga Video: Esther Meyers, *Gentle Yoga for Breast Cancer Survivors*. Available at (416)944-2498, 1-866-300-0433 or brcanvid@istar.ca.