Lymphedema Management Guide

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Lymphatic System: An Introduction

The lymphatic system is a complex network of capillaries that closely follow the blood circulation system. Thin vessels, valves, ducts, nodes and organs help protect and maintain the internal fluid environment of the entire body. This network transports fats, proteins, and other substances, as well as about 10 percent of the fluid from the interstitial spaces during normal metabolism back to the venous system.

Various body dynamics, such as respiratory pressure changes, muscular contractions, movement of the organs and arterioles surrounding lymphatic vessels, and the contractions of the lymph vessels themselves, combine to pump the lymph through the system. Lymph flows into the general circulation through the thoracic duct at a rate of about 125 milliliters per hour during routine activity, and may circulate as much as 1800 milliliters per hour during rigorous exercise. The total amount equals one to four liters per day.²

What Is Lymphedema?

Lymphedema is a visible and palpable swelling of a body part, usually an arm or a leg. The protein-rich fluid, called lymph, gets stuck in the tissue spaces when lymphatic vessels are absent, underdeveloped, or blocked. Damage to the lymphatic vessels can be caused by trauma, reconstructive surgeries, infection, radiation, and/or disease.
Lymphedema Resulting from Cancer Treatment

As a result of cancer treatment:

- Lymphatic vessels may have been removed, scarred from radiation, scarred from surgery, or constricted from muscle/skin scarring.
- Scarring of lymphatic vessels can constrict flow of lymph fluid.
- Hemodynamic balances may have been disrupted, resulting in an increase in arterial flow and/or a decrease in venous return.\textsuperscript{1,2,3,4}
- General deconditioning may occur, which further slows the lymphatic system from lack of movement.
- Use of steroids may increase the lymph obligatory load throughout the body.

All of these factors can combine to produce a "bottleneck traffic jam" effect that prevents the removal of lymph fluid from your arm or leg. The larger proteins in the lymph fluid are not reabsorbed fast enough and remain in the soft tissue, attracting more water, which has more protein, which attracts more fluid.

As more and more lymph fluid becomes trapped, your limb swells. This swelling can cause pain, and make your limb heavy. It also can damage the health of your tissue because nutrients are blocked from reaching your tissue and waste products aren't able to be carried away. In severe cases, recurring infections, cellulitis, and thickening of the skin may occur.

However, not everyone will get lymphedema. There are considerable variations in lymph vessel pathways, which enable some lymphatic systems to bypass the damaged area and function more efficiently than others.\textsuperscript{2,12}

Minimizing Lymphedema

Initial swelling from cancer treatment often resolves by itself. However, if there is still swelling three months after completing your cancer treatment program, then treatment for lymphedema should be sought.

The following activities may minimize the chances of lymphedema occurring (Please consult with your doctor, regarding these activities, before trying them on your own):

- Deep breathing exercises can be started immediately after surgery. Deep breathing helps to enhance lymph flow by creating a
suctioning force from the chest cavity, increasing oxygen flow to tissues, and minimizing tissue tightening of the thoracic wall.

- A gentle stretching program may be initiated as soon as your doctor gives permission. This can decrease muscle and tissue tightness around lymphatic vessels.

- Gentle aerobic activity, such as walking, or riding a stationary bike may enhance lymph flow due to the increased circulation and deep breathing that results with aerobic activity.

- Reconditioning/Strengthening exercises, using light weights, can prepare your limb for normal daily activities by increasing strength, endurance, and range of motion.

Monitor the swelling in your limb. If the swelling increases and stays, then the activity you performed was too strenuous.

- Avoid injury to your skin from scratches, cuts, and insect bites; especially if swelling is already a problem. Wear long sleeves and gloves when gardening or washing dishes.

- Watch for signs of infections (red, hot, puffy, itchy, painful areas) as this can add to the lymph load and worsen the situation. See your doctor immediately if you suspect an infection.

- Keep your skin clean. Use a lotion to keep skin from cracking.

- Avoid prolonged exposure to high heat and sun. The risk of sunburn is high if you had radiation treatment. Seek air conditioning when the weather is very hot.

- Salt and sugar attract fluid, so be mindful about how much you are eating.

Lymphedema is easier to treat in its early stages. Even following the above suggestions, you may still develop lymphedema. Seek a comprehensive treatment program early.
Treating Lymphedema

Treating lymphedema may require a comprehensive decongestive program. A comprehensive decongestive program generally includes the following four components:

- Manual Lymphatic Drainage (MLD)
- Compression Therapy
- Exercise
- Skin Care

Your doctor may prescribe medications as well.

Manual Lymphatic Drainage

Manual Lymphatic Drainage (MLD) is a gentle, relaxing massage technique that enhances the flow of lymph by:

- Activating a stretch reflex in the skin. The lymphangions (lymphatic vessels) are stimulated to increase their rate of contraction and continue even after the massage has ended.
  
  - Affecting the nervous system in such a way that the blood flow and resorption can be increased without increasing blood pressure and filtration.
  
  - Improving immunological responses. Antibodies and lymphocytes can reach tissues more efficiently.
  
  - Encouraging the formation of new channels.
Compression Therapy

Compression Therapy may include the use of short stretch bandaging, compression sleeves, or pumps.

- It supports the elasticity of the skin and underlying tissues so that they may return to their normal shape.
- Improves the efficacy of the pumping action of muscles.
- A mild increase in total tissue pressure improves venous resorption while minimizing arterial filtration.
- Helps maintain the shape of the limb.
- Non gradient sequential compression pumps may be used to assist with venous return. This will decrease the edema somewhat, but it will not remove the protein. This method is ineffectual if used alone.
Exercise

Exercise accelerates the flow of lymph, especially when it is combined with bandaging.

- The flow of lymph increases with exercise due to intermittent pressure and tension on the vessels from pulsing arteries nearby and from muscle contractions.

- Abdominal breathing creates a suction force on the thoracic duct and subclavian juncture.

- Stretching diminishes constriction of lymph vessels from tight muscles.

- Reconditioning prepares the lymphatic system to handle greater demands.
Skin Care

Practicing good skin care is very important in reducing the risks of infection.

- Wash yourself everyday, using mild soap and warm water. Rinse off the soap completely and pat your skin dry with a clean towel.

- Apply a thin layer of lotion to your skin to help prevent cracking and irritation due to dryness.

- Check your skin everyday for cuts, blisters, rashes, sores, etc.

- Foot Care: If your leg has been affected, wear properly fitting cotton socks and change socks daily. Do not go barefoot. Wear leather or canvas, closed-toe, low-heel shoes. Consult a podiatrist for regular foot or nail care.

- Avoid injury to your skin from scratches, cuts, and insect bites; especially if swelling is already a problem. Wear long sleeves and gloves when gardening or washing dishes.

- Watch for signs of infections (red, hot, puffy, itchy, painful areas) as this can add to the lymph load and worsen the situation. See your doctor immediately if you suspect an infection.

- Avoid prolonged exposure to high heat and sun. The risk of sunburn is high if you had radiation treatment. Seek air conditioning when the weather is very hot.
Medications

Medications may be prescribed by your doctor to help control edema. Types of medications that may be used for edema control are:

- **Diuretics**: they remove fluid but do not remove protein and may not be effective for long term edema control.

- **Benzopyrones**: reduce edema by stimulating the body's own macrophages. This helps to breakdown proteins in the interstitial fluid. These drugs have not been approved by the Food and Drug Administration.

- **Alternatives**: bioflavonoid (Vitamin P, the natural pigment in fruits and vegetables) have been used by some people to reduce edema.

Please consult with a healthcare professional regarding use of medications and supplements.

Conclusion

In most cases, if you begin slowly and gradually, while monitoring the level of edema in your limb, you may be able to resume the activities you enjoyed before like bicycling, swimming, hiking, bowling, golfing skiing and more.

Some people may need to modify their activity by limiting the amount of strenuous activity to once a day, or playing 9 holes of golf instead of 18, or traveling an easier ski trail.

Others may need to wrap their limb in order to minimize the edema during activities.

Most mild to moderate lymphedema will respond to compression bandaging and exercise alone. Early intervention is important.

If you have any questions about this information, please check with your doctor or a health care professional. The information provided on this site is meant for education and does not give or replace the medical advice of your doctor or healthcare professional.
References

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