

Lymphedema **Condition and Treatment Overview**

Definition and Cause of Lymphedema

Lymphedema is a chronic swelling of an area due to a permanent obstruction of lymphatic pathways that carry tissue fluid out of an area – especially protein-rich fluid. This obstruction results from surgical removal of lymph nodes, trauma, insufficiency of the lymphatic system and/or scarring from radiation treatment. Because there is inadequate tissue fluid drainage, the fluid becomes stagnant and proteins build up within the tissue. The build-up of stagnant proteins causes chronic low-grade inflammation, fibrosis (hardening) of the tissue, an increase in skin temperature, mild to severe increase in limb girth, decrease in tissue healing ability and high susceptibility to infections or cellulitis in the affected limb.

During the first six weeks following node removal surgery, some arm or leg swelling is typical. Usually swelling can be reduced with elevation and routine recovery exercises. However, if there is a girth increase of more than two centimeters which persists beyond six weeks post-surgery, plus the tissue feels spongy, a physician should be consulted. It is typical for a patient to not notice any increase in swelling in the limb for years and then suddenly develop lymphedema following an additional overload of the lymphatics.

This can occur from incidents such as (but not limited to):

- Bruising of the arm.
- Air travel (rapid changes in pressures).
- Infection (Insect bites, cuts/punctures, etc).
- Overuse syndromes.
- Tumors.
- Filariasis.
- Post-inflammatory thrombosis.

Very early lymphedema can be characterized by soft, pitting edema that is confined to the dermis. Early intervention with a comprehensive lymphedema treatment program can reverse the lymphedematous process and enable the patient to self-manage. If left untreated or re-infection occurs, etc., the lymphedema progresses to a fibrotic, non-pitting state involving both the dermis and subcutaneous departments.

Possible consequences of a failure to appropriately treat lymphedema include:

- Increase in girth size from two centimeters to elephantiasis.
- Chronic, severe infections, not uncommonly resulting in hospitalization.
- Brawny edema, making tissue hard and skin tight, and thus more prone to injury and infection.
- Pain, decrease in sensation and sweat patterns and other sympathetic nerve function deficits resulting from the edema pressing on the cutaneous or deeper nerve endings.
- Loss of range of motion, loss of strength and increased fatigue due to increased limb size and weight.
- ADL limitations.

Manual Lymphedema Treatment (MLT)

The use of MLT for lymphedema is a very complex and multifaceted program of rerouting lymph around blocked, damaged or absent lymph nodes. In order to drain a limb a very

systematic research based process is employed. In general, it begins in the quadrant adjacent to the involved extremity and then progresses to the lymphedematous extremity. MLT takes a trained, skilled therapist to know the anatomy and physiology of the lymphatics in order to route and to individualize for each patient's needs. Much research has been and is being done regarding available pathways, discovering new pathways, determining the efficacy of massage techniques and pathways, etc.

Treatment begins with evaluation by the therapist, which includes:

- Review of patient's surgical and pathology reports.
- Review of any post-surgical complications.
- Determination of pre-existing pathology which did or is now causing edema (i.e. carpal tunnel or brachial plexus problems).
- Physical examination and charting of incision sites.
- Review of tissue and stage of lymphedema.
- Review of posture and skeletal alignment status.
- Sensory evaluation in deficit areas.
- Range of motion and muscle testing in deficit area.
- Girth measurements (circumferential, volumetric displacement).
- Overview of ADL and/or work requirements.

MLT techniques consist of **Light Massage, Exercise, Medical Compression Bandages, and Pneumatic Pump.**

Light Massage: Light Massage consists of 20 to 40 mmHg. pressure, and facilitates:

- Rerouting of lymph around blocked or damaged lymph node collection sites.
- Opening and widening of collateral lymph pathways to become permanent drainage areas.
- Release of protein molecules from the tissue, which are then moved along with the excess fluid into the lymphatic capillaries and out of the limb (reducing the amount of these water-absorbent protein molecules reduces the amount of reabsorbed fluid in the limb).
- Reduction in susceptibility to infection by removal of stagnant proteins.
- Reduction in proneness to injury by softening hard fibrotic tissue.

Exercise: There are specific exercises which facilitate lymph drainage because they mimic the MLT sequence. Patients are instructed to perform these exercises as part of their daily home treatment program for the rest of their lives. Also, patients are taught physical conditioning, range of motion and strengthening exercises as individually needed. Exercise precautions must be observed to prevent exacerbation of the lymphedema:

- Never use more than three to five pounds of free weights or 30 pounds resistance on machines.
- Avoid fatigue or overuse of involved musculature.
- Contact sports are to be avoided as well as repetitive motion sports that may lead to overuse syndrome or exacerbation of lymphedema.

Medical Compression Bandaging: These are minimal to non-elastic (20% elasticity or less) bandages, worn three to four layers thick on the entire involved limb. Before the bandages are applied a soft stockinette layer and strong cotton wrap (cast liner type) are placed on the extremity. Patients wear these 24 hours a day and re-wrap three to four times a day or as needed. Once the tissue has remodeled (shrunk), excessive protein has been removed, and the lymphatic drainage pathways are increased, the patient can reduce wearing the compression bandages.

The bandaging process:

- Provides a firm, external, non-elastic support to tissue acting as a counter-force to muscle contraction and promoting lymphatic pumping during even the slightest muscle contraction, but does not compress lymphatics when at rest.
- Prevents re-filling of tissue spaces with fluid while tissue re-shaping is taking place.
- Helps to soften fibrotic tissue.

Pneumatic Pump: This is also used to soften fibrotic tissue and remove fluid. Theories concerning use of the pneumatic pump are changing. Pumping alone moves only the fluid, not the protein molecules out of the limb. Protein remains in the limb, and can re-absorb fluid, continuing the cycle. Also, pumping reduces the limb only so far as the sleeve will allow. This often results in the fluid settling in an enlargement around the axilla or groin where the blockage exists. Pumping is now thought to be most effective when used in conjunction with MLI, exercise and bandaging - pneumatic pumping is not a treatment by itself. A goal of the Lymphedema Treatment Program is to make pumping an occasional treatment used as needed by patients who have completed the program.

Post-Treatment

The post-treatment goal of this program is to give the patient the tools needed to control lymphedema once it is reduced through treatment. Self-management consists of training and education in:

- Medical compression bandaging and or compression garment.
- Lymphatic drainage exercises.
- Conditioning programs.
- Ergonomic adaptations (if needed).
- Self massage.
- Skin hygiene and care.