



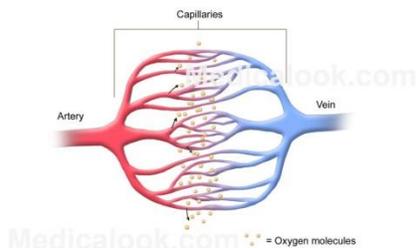
Lymphedema: Treatment of the Swollen Limb

Approximately 60% of our body mass is composed of fluid. Interstitial spaces or compartments are the spaces within the tissues that are outside of the blood vessels and under the skin.

The fluid in this space is called interstitial fluid. **Our bodies have two systems to deal with body fluid:**

The blood circulatory system

The lymph circulatory system



The Blood System

The Blood System moves fluid **into** the tissues from the blood capillaries to bring oxygen and nutrition to the tissues. 90% of fluid moves **out** of the tissues by the blood system to remove waste products from the tissues and to be re-oxygenated. The other 10% of

fluids is managed by the lymph system. When either system fails to function correctly, fluid accumulates in the interstitial spaces and swelling occurs.

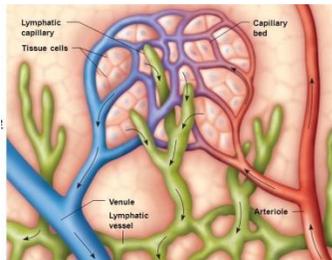
Edema

When the blood system is not working correctly, the swelling that results is called edema. Edema can result from:

- Conditions that increase fluid pressure such as venous insufficiency, congestive heart failure, deep vein thrombosis, reflex sympathetic dystrophy
- Conditions that decrease oncotic pressure such as heavy loss of blood protein with renal disease, malnutrition, malabsorption, cirrhosis
- Conditions that result in altered permeability such as trauma, burns, infection, chemo and radiation therapy

Edema can result from any other impairment of the blood system which is not lymphedema. When the blood system is not working correctly, the lymph system

works harder and faster to pick up the slack. Chronic edema, left untreated, can progress into lymphedema.



The Lymphatic System

The lymphatic system is composed of superficial capillaries (pre-lymphatics) that empty into deeper collectors - valved vessels, lymph nodes, and valved trunks.

The lymph capillaries are just under the skin and cover the body like a net. The capillaries end in 1-3 finger-like projections that are held in place with fibers called anchoring filaments. A rise in fluid levels, haphazard forces, and muscle contractions put tension on the anchoring filaments which pull the swing flaps open, allowing fluid and molecules to enter. The lymphatic system is designed to carry large molecules:

- nutrients such as fat and proteins
- immune components
- waste products such as foreign molecules, bacteria and virus.

It filters the fluid through the lymph nodes before it is returned to the blood system. The lymph nodes filter the lymph fluid for foreign bodies and activate white blood cells to attack and destroy them. It is estimated there are between 600 – 700 lymph nodes in the human body. There are approximately 15-25 lymph nodes under each arm and 6-12 in each groin.



Lymphedema

Lymphedema occurs when the lymphatic system is not functioning sufficiently to transport lymph fluid from the tissues back into the blood circulation system. Left untreated, protein-rich lymphedema fluid reduces oxygen availability:

- The limbs feel tired and heavy.
- The skin of the limb becomes oxygen deficient, dry and flaky. This can lead to itching, scratching, infection, and/or wounds.

- Low oxygen availability interferes with wound healing, and provides a medium for bacteria that can result in infection (cellulitis).

Lymphedema can develop when lymphatic vessels are missing or impaired – called Primary Lymphedema. Or when lymph vessels are damaged or lymph nodes removed – called Secondary Lymphedema.

Primary lymphedemas are birth disorders:

- Milroy is familial and occurs at birth
- Merge is familial and occurs at puberty
- Lymphedema praecox is non-familial and occurs at birth or puberty
- Lymphedema tardum is non-familial and occurs at middle adult years.

Secondary lymphedema, or acquired lymphedema, occurs when a normally functioning lymphatic system is interrupted by surgery, radiation, infection, trauma, toxins, or parasites. In the U.S., cancer and cancer treatment are the leading cause of lymphedema. Secondary lymphedema can develop immediately post-operatively, or weeks, months, even years later.



Risk Factors for Lymphedema

Risk Factors for Lymphedema Include:

- Surgery that requires removal of lymph nodes
- Chemotherapy
- Radiation therapy that damages otherwise healthy lymph nodes and vessels, causing scar tissue to form which interrupts the normal flow of the lymphatic fluid.
- Cellulites - an infection which interrupts normal lymphatic pathway function.
- Repeated aspirations of a seroma (a pocket of fluid which occurs commonly post-operatively). This often causes infection and, subsequently, lymphedema.
- Severe traumatic injury that interrupts and/or damages the lymphatic system.

Lymphedema can occur anywhere in the body, depending on where the impendence to lymph function is. It can manifest in the arms, face, neck, breast, trunk, axilla, legs or groin. Signs or symptoms of lymphedema include:

- a full sensation in the limb(s)
- skin feeling tight
- decreased flexibility in the hand, wrist or ankle
- difficulty fitting into clothing in one specific area, or ring/wristwatch/bracelet tightness.

If you notice persistent swelling, it is very important that you seek treatment. Early diagnosis and treatment improves both the prognosis and the condition. Get at least one second opinion if you are not satisfied with your doctor's recommendations.



Treatment of Lymphedema

A treatment approach based on the Complex Decongestive Therapy (CDT) methods gives the best results. Complex Decongestive Therapy includes:

- Manual Lymphatic Drainage
- Compression: Bandaging and/or Compression Garments
- Remedial Exercises
- Proper Skin Care & Diet

Therapy can be provided by massage therapists, occupational therapists or physical therapists who have completed basic or advanced training in treatment of lymphedema. Basic training involves 16 hours of course work and lab. Advanced training involves 135 hours of course work and lab ending with a certification exam.

Treatment: What To Expect



Evaluation

At the initial evaluation, the therapist will take your medical history:

- When swelling started and how quickly it progressed



- Occurrence of cancer, injury or illness
- Surgeries, lymph node dissections
- Chemo & radiation treatments,
- Infections, cellulitis, pain and other factors that are related to your lymphedema.
- Baseline measurements will be taken to determine lymphedema volume.

If swelling is in an arm or leg, measurements of both limbs are taken to compare the difference between the swollen and non-swollen limb. Pictures may be taken of the swollen limb or if swelling is in the face, neck, breast or trunk. This helps to determine what the course of treatment should be and gives a baseline from which progress can be measured.

Treatment

Treatment sessions are typically scheduled as one-hour sessions, 2-3 times per week initially, then tapering to 1 time per week as you make progress. The patient and therapist will work together to develop an individualized treatment plan to address the lymphedema.



Skin Care

Skin Care Education is part of treatment and includes information to minimize the possibility of infection:

- cleansing with antibacterial washes and moisturizing lotions to help eliminate bacterial and fungal growth
- reducing risk of scratches, punctures or other openings in the skin

Risk Factors

Treatment includes education on risk factors and includes information on:

- what your risk factors are
- how to minimize risk of a flare-up
- when to seek intervention

Manual Lymph Drainage

Each session includes Manual Lymph Decongestion (MLD). MLD is a massage that opens the lymphatics and stimulates their activity to drain the affected area. MLD provides light touch on the skin that stimulates the initial lymphatics to dilate. The node sites are stimulated first to prepare them for an increase in fluid movement. The movement of the skin pulls the anchoring filaments which, in turn, opens the gap junctions and allows fluid to enter the lymphatic system. MLD increases the lymph transport load, increase the lymph transport rate and influence the direction of the lymph fluid.

In theory, the therapist can direct the fluid to enable fluid trapped in damaged quadrants to be moved to non-damaged quadrants. The limb is then drained working proximal to distal – the area you want the fluid to move into must be emptied before the fluid can move in. Effects of this stimulation are known to last for approximately one hour.



Compression

Compression is used to maintain the fluid reduction - Bandaging or other types of compression follows each MLD session. External graduated compression has a massaging effect on the muscle pump and improves return of venous blood. Teamed with muscle contraction, blood circulation increases and assures a better oxygen supply to the affected

limb.

Short Stretch Bandages

Short stretch bandages look like Ace bandages but have less elastic. They provide a limited stretch, so they give little pressure at rest but prevent expansion of the muscle diameter when the muscles are contracting.

This forces the deep venous system to increase its working pressure during muscular relaxation, allowing a more intense retrograde refilling of superficial veins to occur.

Compression Garments

Once the goal of reduction is achieved, garments are fitted and worn to maintain the reduction. Compression sleeves and stockings provide

stretch, so they give high pressure when muscles are at rest but allow muscles to expand with contraction. This affects the superficial venous system and they provide compression of superficial veins at all times.



Exercise

Lymphedema exercise is active motion of the involved extremity. The goal of exercise is to enhance the muscle pump activity and thus promote improved venous and lymphatic return in the involved extremity. Exercise done in compression enhances the muscle pump action. Exercise can include any one or combination of the following types of exercise:

Flexibility/Stretching Exercise

Goal - stretch soft tissues thereby minimizing tightness and the effects of scarring which can block lymph flow.

Resistive Exercise

Goal - improve muscle power, stamina and tone. The introduction of weights should be gradual.

Aerobic Conditioning

Goal - improve or maintain cardiovascular fitness. Methods include walking, jogging, cycling, and swimming.

Caution: Exercise can have potential negative effects to individuals with lymphedema. Blood flow is increased during exercise possibly causing an increase in lymphatic load. Increased muscle metabolism results in an increase in metabolic waste. Improper exercise may cause inflammation and trauma to the tissues.



Measurements

Circumferential measurements are taken on a weekly basis or when a change occurs to determine progress.

Home Programs

Patient training enables individuals to become independent in managing lymphedema. You will be taught how to do manual lymph drainage, use

compression and complete skin hygiene on yourself early on in the treatment program. This will help you will feel comfortable doing the home program at the time of discharge.

As you achieve reduction and become independent with your home program, session frequency is decreased:

- 2-3 times per week
- 1 time per week
- 1 time per 2 weeks
- 1 time per month

Follow-up sessions are typically scheduled on a monthly basis after you have completed the program. Follow-up continues for as long as needed to ensure your reduction is being maintained.

Although lymphedema is a condition that cannot be cured, it can be managed to enable you to accomplish the things that are important to you.