

## **THE LYMPH SYSTEM AND LYMPHEDEMA**

### **The Lymphatic System**

The lymphatic system is made up of lymph (a clear fluid), lymph vessels and lymph nodes. It is responsible for returning excess fluid and proteins from the tissues to the circulation and plays an important role in protecting us against disease and illness.

The lymph fluid is the fluid in-between the cells and in the tissues. It travels from the tissue spaces through vessels to the lymph nodes where the fluid is then filtered and cleaned. From there it continues through the larger lymphatic vessels, the thoracic duct and right lymphatic duct, to the veins in the neck area where the fluid then joins the blood circulation. The initial lymph vessels, called capillaries, are open ended, meaning the fluid can move from tissues into the capillary and is then moved to the next section of the vessel. Small valves do not allow the lymph fluid to flow back. The lymph fluid moves as our muscles contract and as we breathe.

The lymphatic system also has the ability to absorb excess fluid that is not reabsorbed by the veins. The veins pick up 90% of the fluid in the tissue and the lymph vessels transport the remaining 10%. In times of stress, trauma, edema, the lymphatic system can transport a much larger quantity of fluid.

The lymph fluid is clear and contains protein, fats, waste products, cells, water, chemical and foreign organisms (e.g.) viruses and bacteria). The lymph nodes filter out these foreign substances which are destroyed by macrophages, T cells and B cells. This is our immune system and helps keep us healthy.

### **Edema**

When we have an injury or inflammation there is swelling to that area. If we stand or sit for long periods of time, our legs may swell. This is called EDEMA, because there is an excessive accumulation of fluid in the tissues. However, the lymphatic system is not permanently damaged but just overloaded. Just think of a very heavy rainstorm, and then the streets may flood temporarily because the sewer system is overloaded. The veins and lymphatic will transport this excess fluid eventually and the swelling will go down.

### **Lymphedema**

When a person has lymphedema the ability of the lymphatic system to transport fluid has been compromised usually because of damage, trauma or surgery. The protein rich fluid accumulates in the tissue spaces and causes the limb to enlarge. The excess swelling decreases the oxygenation in the tissues and interferes with the normal cell function.

As the lymph stagnates in the tissues, it provides an excellent medium for bacterial growth and thus increases the risk for an infection. As the lymph fluid contains proteins, and proteins are the building block of tissues, the exceed proteins can become thickened and hard (fibrotic). The whole limb does not become fibrotic, but only in small area. The tissue feels harder or thicker under the skin.

Swelling in a limb may occur slowly, starting in the shoulder or armpit and not be noticed. You may notice the arm is swollen one day and not the next. This is an early stage of lymphedema and many times, is not diagnosed by the physician.

Swelling in the leg can be in the foot or above the area of injury. Lymphedema can be anywhere, in the chest, in the face, in the genitals. Any area that has been radiated or Lymph nodes surgically removed can be at risk for developing a secondary Lymphedema.

Sometimes if a person is overweight and the limb(s) starts to swell, it is easy to misdiagnosis the condition. As lymphedema progresses and the limb becomes larger you may feel pain or discomfort in the back, shoulder, knees. The enlarged limb can affect your posture and gait.

You may notice other changes as well. The skin on the affected limb sometimes becomes thicker or red. The limb may feel warmer than the unaffected side.

Once the lymph system is damaged, lymphedema may occur at any time. Sometimes it starts at once and lasts for life; sometimes it appears 20 years after the event. There is no way to predict who will get lymphedema. A very minor injury can trigger the onset of lymphedema (e.g. bee sting, sunburn, lifting weights, infection).

### **What does lymphedema feel like?**

- You may have no unusual sensations and notice the limb looks larger than the other
- Feeling of tightness and heaviness in the limb.
- Aching buttocks (leg lymphedema) or shoulder (arm lymphedema)
- Pins and needles in the limb
- Shooting pains
- A feeling of tightness and tenderness in the elbow or behind the knee
- Pain in the joints similar to arthritis
- Tenderness in the groin of the affected leg
- Leaking of lymph fluid from the skin

## **Types of Lymphedema**

There are two main types of lymphedema: primary or congenital and secondary.

**Primary/congenital lymphedema** most commonly occurs in females. Usually one limb is affected. In primary lymphedema the vessels are inadequate to transport the fluid. There can be too few lymph vessels or the vessels are too large and the valves do not function properly. This condition can appear at birth, puberty or later in life.

**Secondary lymphedema can result from:**

- Surgery, especially from cancer with lymph node removal
- Radiation therapy
- Chemotherapy
- Accidental trauma
- Chronic venous insufficiency
- Repeated infections in a limb
- Parasites, most common in tropical countries
- Postoperative infection

**Factors that may contribute to the development of lymphedema in a person at risk:**

- Obesity
- Any infection in the “at risk” limb
- Constrictive clothing or jewelry
- Long airplane travel (change in the cabin pressure)
- Recurrent trauma to the remaining lymphatic vessels
- Heavy breast prostheses
- Lifting or pushing heavy objects
- Weigh training at the gym (especially if you have never lifted weights)
- Taking repeated blood pressure and blood from the affected arm
- Repetitive motions that overstrains the arm

**Please remember, at this point in time, there is no clear understanding of all the causes of lymphedema and there is no cure. However with early intervention, the condition can be managed.**

- Wear your compression stocking during all waking hours. At least every 3-6 months see your therapist for follow up. If the garment is too loose, your leg probably has reduced in circumference or the garment has lost its original compression quality.
- Always wear closed shoes, or well fitted boots. No sandals, slippers, or going barefoot.
- See a podiatrist once a year, or more if necessary as prophylaxis for fungi, ingrown toenails, or calluses.
- Use talcum powder on feet, especially if you perspire a great deal. It will be easier to pull on compression stockings and powder behind the knee often helps to prevent irritation.
- **Important:** Maintain your ideal weight through well balanced, low sodium, high fiber diet. Avoid smoking (affects circulation) and alcohol (affects liver function).

Lymphedema is a high protein edema, but eating too little protein does not reduce the protein in the tissues.

- If you notice a rash, blistering, redness, heat in the leg, or fever contact your physician immediately.
- Carry a first aid kit with you at all times, this includes: alcohol wipes, antibiotic cream and Band-Aids.

## TREATMENT OF LYMPHEDEMA

Treatment of lymphedema should begin as soon as possible.. At present, the most effective and least invasive approach is referred to as Complex Decongestive Physiotherapy (CDP). The length of treatment depends upon the severity and duration of lymphedema.

### *Four steps of complex decongestive physiotherapy:*

#### 1. Skin hygiene

Eliminate bacterial and fungal growth by

- a. Daily bathing
- b. Careful and thorough drying between skin folds, fingers and toes
- c. Use of low pH skin lotion daily

#### 2. Manual lymph drainage (MLD)

- a. Specific manual hand movements that follow lymph pathways to facilitate the movement of fluid in the lymph vessels.
- b. Creates alternate pathways for lymph drainage
- c. Facilitates the flow of lymph into the blood circulation and allows the limb to return to near normal size.
- d. Manual hand movements are very light, slow and rhythmic.
- e. Treatment are usually 1 to 1 ½ hours daily.

#### 3. Bandaging and compression

- a. Bandaging follows the MLD session.
- b. "Low" stretch bandages prevent re-accumulation of lymph fluid in the tissues.
- c. Bandages are worn overnight until the next MLD session.
- d. Clothes with large arm holes/pant legs and large shoes or sandals may be needed to fit over the bulk of the bandages.
- e. At the end of the course of treatment, a ready made or custom measured garment is ordered.

#### 4. Remedial Exercises

- a. Exercises are performed while the limb is bandaged
- b. General and individual exercise routines will be taught by your therapist

### **Follow up and maintenance**

- a. During the intensive phase of the treatment you will be taught self massage, skin care, exercises and self-bandaging, which should be continued at home.
- b. Follow up visits are recommended every 3 to 6 months, or as recommended by your therapist.
- c. Support groups may be helpful to the patient. A list can be obtained from your therapist.