

pt connection

by Orthopedic & Sports P.T. Assoc. OSPTA

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Lymphedema

WHAT IS LYMPHEDEMA?

Lymphedema is an accumulation of lymphatic fluid in the interstitial tissue that causes swelling in the arm(s) or leg(s). When the lymphatic fluid exceeds the transport capacity of the lymphatic system, an abnormal amount of protein-rich fluid collects in the tissues of the affected area. If untreated, this fluid not only causes tissue channels to increase in size and number, but also reduces oxygen availability in the transport system, decreases wound healing, and provides a culture medium for bacteria that may result in lymphangitis (infection).

Lymphedema can develop in any part of the body or limb(s). Symptoms of lymphedema include skin feeling tight; a full sensation in the limb(s); decreased flexibility in the hand, wrist, or ankle; difficulty fitting into clothing in one specific area; or ring/wristwatch/bracelet tightness. Patients with lymphedema may experience pain, decreased motion, and decreased function of the affected limb. Additionally, lymphedema can result in cosmetic deformity and psychological discomfort. 30% of women will develop significant lymphedema after axillary node dissection.

Early edema (Grade I) is protein rich fluid accumulation. The swollen limb will be soft and there is pitting edema. Maximal increase in girth occurs in the first year. The swelling will reduce with elevation and will often disappear overnight.

Late edema (Grade II) is inflammatory fibrosis secondary to the high concentration of protein. The tissue is no longer pitting and becomes thickened and hard. At this stage, elevation will not change the swelling and the condition may be refractory to treatment.

WHAT CAUSES LYMPHEDEMA?

Lymphedema can be divided into primary and secondary lymphedema by considering the inherent and acquired pathology of the condition. Primary lymphedema is a developmental disorder in which there is a fault within the lymph conducting pathways. The most common primary lymphedema is related to Milroy's disease in which the initial lymphatics appear absent. Primary lymphedema is more common in females than males and develops more often in the legs than arms. Secondary lymphedema is due to damage to a normally functioning lymphatic system. Such damage can be caused by the following:

- Surgery or Radiation Treatment
- Liposuction
- Burns
- Tumor
- Chronic Venous Insufficiency
- Varicose Vein Stripping
- Trauma
- Large Abrasions
- Infection

Specific surgeries such as surgery for cancer of the breast, prostate, testicles, colon, bladder, or even head and neck can result in secondary lymphedema. It can develop immediately post-operatively or weeks, months, even years later.

Allied with the causes of secondary lymphedema is the specific condition of lipidema. In lipidema, a pathological amount of fat cells occur particularly from hip to ankle. The patient is often obese. In the normal individual, the lymph vessels occur in a straight line, while in a patient with lipidema, the lymphatic vessels have a corkscrew pattern secondary to fat cells pushing the lymphatic aside. Females are predominantly affected by lipidema and its symptoms include symmetrical distribution (both legs are enlarged); feet are not involved; large fat deposits medial to knee; palpation can be very painful, bruise easily; and mattress-like tissue.

WHAT IS THE LYMPHATIC SYSTEM?

The principal function of the lymphatic system is to maintain the blood volume by returning fluid and proteins that flow from the blood capillaries to the interstitial space back to the general circulation. Additionally, lymphocytes within the system have a role in the process of defense against infection and tumor growth. This system eliminates dying or mutant cells and removes bacteria, viruses, as well as foreign particles from the intercellular space. The lymphatic system assists the organism in the process of homeostasis.

The smallest units of the lymphatic system are the initial lymphatics. These are arranged in plexus-like patterns with the connective tissues and thus are indirectly attached to the skin. The initial lymphatics are responsible for lymph formation, which is the intake of interstitial fluid. In the walls of the initial lymphatic are endothelial junctions that provide a one-way valve system to prevent lymph flow reversal. Next, the lymph travels to the collectors. The collectors possess valves and their walls are composed of 3 layers: tunica intima, tunica media, and tunica adventitious. The contractions of the collectors help push the lymph to the next level, the lymph nodes. Lymph nodes are present in groups and are located along the blood vessels. Their number, form, and size may vary. The human body can contain up to 600-700 lymph nodes but there is considerable individual variation. Lymph nodes have 3 functions:

1. Filtering stations - protective function to prevent any damaging material from reaching the blood circulation
2. Produce lymphocytes - support the immune system
3. Regulate the amount of protein in the lymph fluid

Next the lymph travels to the post-nodal collecting lymphatics which drain into the circulatory system via large blood vessels (thoracic duct, jugular duct,

subclavian duct, bronchomediastinal duct). These ducts join the venous circulation at the angle between the left subclavian vein and internal jugular vein. (See figure 1)

WHAT IS THE TREATMENT FOR LYMPHEDEMA?

Management of lymphedema consists of a combination of manual lymph drainage (MLD), multilayered bandaging, compression devices and garments, and patient education. Such treatment should be carried out by a trained physical or occupational therapist. The therapist will begin the initial evaluation by asking the patient a series of questions regarding the etiology of the lymphedema, as well as episodes of exacerbation of the swelling. Then he/she will assess the skin integrity of the affected limb and determine the stage of lymphedema. A gross musculoskeletal screen will be performed as well as detailed range of motion and strength screen of the affected limb. Next, the therapist will take circumferential measurements of the extremity and compare them to the unaffected limb. These measurements will be utilized throughout the course of treatment to determine the effectiveness of the treatment.

The first phase of treatment is manual lymph drainage (MLD). MLD is a gentle form of massage that mobilizes the skin to enhance lymphatic flow. Studies have proven that MLD significantly increases the reabsorption of proteins and increases the lymphatic flow. MLD must be performed by trained medical professionals. In a study of healthy individuals, manual massage performed for 10 minutes with a frequency of 25 strokes per minute with pressure of 70 to 100 mm HG causes damage to the lymphatics. Therefore, one must be trained specifically in MLD so as not to inadvertently cause more damage to the lymphatic system.

After MLD, the therapist will perform bandaging of the affected limb. Multilayered bandaging is implemented to get a significant decrease of volume in a short period of time. The therapist will apply a compression bandage to the affected limb that should be worn for 24 hours. The global bandage is rigid but will allow gross mobility like squatting for the lower extremity and reaching for the upper extremity. After application of the bandage, the patient should perform his/her normal activity in order to produce muscle contractions needed to increase lymphatic flow. The bandage will be removed and

Figure 1

Initial I

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Lymph

Post Noda

Large Bl

Venous S



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NEWS *briefs*

Ms. Jodi DeBlassio, PT and Ms. Kelly Hohn, PT have begun treating UI and lymphedema. If you feel that you have symptoms, please make an appointment with your physician. Your physician can discuss treatment options and determine if physical therapy can help lessen your UI or lymphedema symptoms. To make an appointment, please call 1-888-279-4107.

OSPTA continues to emphasize patient satisfaction and clinical outcomes. For the 1st quarter, patient satisfaction was 98%. Our clinical pathways were met 70% of the time. For all diagnoses, the average number of visits was 9.45. Our patient's functional status was improved 50%, their perceived improvement was 72%, and they experienced a 58% reduction in their pain.

OSPTA welcomes Mr. Jeff Sofran, PT and Mr. Scott Wilson, PT to our staff.

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