

BUILDING THE CASE FOR LYMPHEDEMA THERAPY FOR PREVENTION OF SECONDARY COMPLICATIONS AFTER INJURY

Julia Castleberry MS PT, DPT, CLT, GCS, NCS

This article services as an introduction to lymphedema therapy to encourage therapists to consider the prevention of secondary complications caused by immobility and venous stasis. Often clients present with limited mobility and remain positioned in bed or in a wheelchair for prolong periods of time. Unfortunately, immobility combined with diabetic and circulatory compromise can lead to lower extremity edema and the formation wounds. Therapeutic interventions can intercede to assist in preventing these secondary complications.

Lymphedema therapy has gradually gained a foothold in the United States as a means to manage edema in clients with a variety of diagnoses. Initially lymphedema therapy was associated with the treatment of edema after lymph node removal associated with breast cancer surgery. Currently, lymphedema therapy interventions have gained recognition in the treatment of edema associated with orthopedic surgeries such as minimally invasive hip replacements and knee arthroscopic procedures as well as with bilateral lower extremity stasis edema and wounds. Lymphedema therapy is a cost efficient and effective intervention to prevent secondary complications caused by immobility and venous stasis.

Wound care clinics are incorporating lymphedema therapy to assist with edema management of chronic wounds, venous and diabetic ulcers. Hospitals, outpatient and skilled nursing centers are encouraging occupational and physical therapists and therapist assistants to pursue lymphedema certification. Edema and wound management interventions including lymphedema therapy techniques have had a significant impact in the reduction of the re-occurrence of wounds in residents of long term care centers. (Unpublished data collected by author, 2013).

The focus of lymphedema therapy is to reduce and to develop a plan to manage edema for the long term. The lymphatic system is a passive system and relies on the active circulatory system and muscle contractions to move fluid out of the interstitial into the circulatory system. If the circulatory system and/or the musculoskeletal system is compromised, gentle manual and compression techniques can be utilize to facilitate the excess fluid movement into circulation and to assist in excess fluid reaching the elimination system.

The lymphatic system and the circulatory system work together recirculate fluid to maintain blood flow and volume, tissue perfusion, and to remove wastes. The normal function of lymphatic system also includes returning proteins, water, and lipids from the interstitial space and to assist the body's immune function. The lymph system is a low flow system which acts as an assist to the venous system in returning fluid that has accumulated in the interstitial space. If the venous system is distended and the valve mechanisms fail, fluid will accumulate in the interstitial space, thus developing lymphedema (Zuther, 2009).

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Lymphatic System Anatomy

The lymphatic system lies parallel to the circulatory system. This open passive loop system allows fluid to travel back to the cardiovascular system. The venous system carries approximately 80% of the returning fluid. The remaining 10-20% is returned by the lymphatic system (Zuther, 2009).

The human body is comprised of 500-600 lymph nodes. The abdomen contains the most lymph nodes (~200-300 nodes), followed by groin area with approximately 50-70 nodes each, and the neck and axilla with ~ 30-50 nodes each (Zuther, 2009).

Functions of the Lymphatic System

The lymph nodes serve to filter the lymph fluid, to thicken the lymph fluid, to make lymphocytes, and to store collected material which can not be removed by the body such as coal, dust, silica, and glass. The lymph fluid cleans and filters the tissues with the nodes storing non removable material and excess fluid is carried by lymphatic system back to the circulatory system. The lymph fluid carries white blood cells, fats, and wastes (Zuther, 2009).

Types of Lymphedema

Primary lymphedema has an unknown etiology. Primary lymphedema is most likely due to a malformation of the lymph vessels during fetal development. Primary lymphedema is considered an inherited disorder with approximately 1.15/100,000 diagnosed before age 20, with 4:1 ratio female to male (Warren, 2007).

Secondary lymphedema is an acquired disorder most commonly caused by invasive procedures such as surgery and radiation. Secondary lymphedema occurs due to the damage and trauma of the lymph vessels and nodes. It is estimated there are 3 million new cases (venous insufficiency included with at risk population) in the United States every year (Warren, 2007).

There are multiple causes of secondary lymphedema which include caesarean section child birth, surgery such as cardiac bypass grafting, hip and knee replacement, status post lymph node removal associated with neck surgery and cancer. Secondary lymphedema is often present with dependent positioning and with immobile persons. Consider persons dependent upon a wheel chair for mobility, out of bed positioning and transportation such as persons with spinal cord injuries, survivors of stroke and traumatic brain injury, cerebral palsy, and multiple sclerosis. Non-ambulatory persons may suffer from stasis edema and often develop cellulitis and wounds. After surgeries for hip fracture repair or knee arthroscopy, many clients suffer with post-surgery edema/lymphedema hindering range of motion and mobility.

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Lymphedema Assessment

Table 1 describes the pitting edema scale. This scale is an easy to use objective measure of edema/lymphedema.

Scale	Description
1+	Barely detectable impression when finger is pressed into skin
2+	Slight indentation (15 seconds to rebound)
3+	Deeper indentation (up to 30 seconds to rebound)
4+	30 seconds to rebound

Table 1 created from information provided on the Pitting Edema Scale: O'Sullivan, S.B. & Schmitz, T.J. (2007). *Physical rehabilitation: assessment and treatment* (5th ed). Philadelphia: F. A. Davis Company. p.659.

Staging or Grading Lymphedema (Table 2)

Stages of Lymphedema	Description
 <p style="text-align: right;">Stage 0</p>	<ul style="list-style-type: none"> • Lymph transport capacity limited • No clinical evidence of edema • May have sensation of heaviness, ache, fatigue in the involved extremity
 <p style="text-align: right;">Stage I</p>	<ul style="list-style-type: none"> • Soft <u>pitting</u> edema • Accumulation of protein-rich, pitting edema (which can be reversed through elevation) • Increases with activity, humidity, and heat
 <p style="text-align: right;">Stage 2</p>	<ul style="list-style-type: none"> • Accumulation of protein-rich, <u>non-pitting</u> edema due to presence of connective scar tissue • Clinical fibrosis present • Severe stage II, may see skin changes (warts, eczema)
 <p style="text-align: right;">Stage 3</p>	<ul style="list-style-type: none"> • Referred to as lymph-static/ elephantiasis • Severe, non-pitting, fibrotic • Increase in connective and scar tissue accumulation • Skin becomes thicker and leathery; folds develop • May develop cracking of skin • Yeast, fungi, and bacterial infections can be common

<http://blog.wcei.net/2011/06/nawc-introduces-new-advanced-certification/>

Table 2 created with information gathered from Zuther, J.E. (2009). *Lymphedema management* (2nd ed.). New York, NY: Thieme Medical Publishers. Pictures provided by author unless otherwise noted.

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Other Signs and Symptoms of Lymphedema

Aside from swelling and fibrosis, the following may also be present:

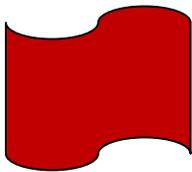
- Skin changes
- Altered Sensation
- Impairments in strength and functional abilities
- Pain
- Numbness
- Fatigue
- Burning
- Psychological issues associated with appearance

The psychological consequences of lymphedema can be enormous for clients. As they have difficulty moving due to the lymphedema, loss of independence, loss continence, and loss of social interaction can be profound.

When it is not Lymphedema

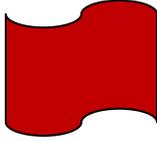
Lipedema is a disorder of the lymph system formation in development. The lymph system has cork screw formations which trap deposits of subcutaneous adipose tissue. Lipedema clients are easy to spot as they present with bilateral swelling from hips to malleoli. Feet are not affected. A client will appear with a large buttock shelf and a relatively small portioined upper quadrant. Losing weight does not change the bilateral lower quadrant and lower extremity presentation. Lipedema does respond to lymphedema therapy and compression (Zuther, 2009).

Contraindications for therapy to treat lymphedema



- Acute sudden onset edema with unknown etiology edema
- Client has a Deep Vein Thrombosis (DVT) or suspected DVT or Pulmonary emboli (PE)
- Acute Congestive Heart Failure, compromised cardiopulmonary system, angina
- Uncontrolled Hypertension, difficulty with hypertension management
- Acute Renal Failure (dialysis is contraindicated); compromised renal system
- Acute Inflammation, Infection, Gout, or Cellulitis with symptoms (fever, chills, red streaking)
 - May treat lymphedema after on antibiotics for 48-72 hours depending on referring health care provider.
- Untreated Cancers
- Active Bleeding (internal or external)
- Aortic aneurysm history
- During a bronchial asthma flare up
- Hyperthyroidism

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- Shortness of Breath (before/during or after treatment)
 - Arterial Insufficiency
 - Severe Arterial Disease [Peripheral artery disease (PAD) defined by Ankle Branchial Index (ABI) of <.5]
- Recent healing skin is at risk for re-injury
 - Carotid stenosis or thyroid disorder: no manual techniques over the neck area
 - Menses: avoid abdominal area as there is active bleeding present
 - Medications: especially chemotherapy agents have body dose residual times and must remain in the body for a prescribed period of time. Lymphedema therapy techniques are not recommended while receiving chemotherapy. Consult the referring healthcare provider. Beware of all your client's medications.

Edema related to trauma, surgical procedure, or systemic edema will require medical clearance and a referral to a certified lymphedema therapist (Manual lymph drainage/Completed decongestive physiotherapy).

Lymphedema Therapy Treatment

Manual techniques are only one aspect to lymphedema therapy treatment. The manual techniques are very light and gentle. Only superficial skin is moved to stimulate the underlying lymph network. Combined with deep abdominal breathing and regional node group stimulation, lymphedema drainage can occur.

Conservative lymphedema management techniques involve manual therapy (complete decongestive therapy/CDT), education, elevation, skin care, exercises, functional mobility and activities. Once the lymphedema has been reduced with manual techniques and compression bandaging (multiple layer short-stretch bandages not Ace wraps), the limb size needs to be maintained. The client is then fitted with a compression garment if appropriate. All elements must be performed to be considered and billed as lymphedema therapy. Lymphedema therapy can be billed as manual therapy techniques, therapeutic exercises, therapeutic activities, patient education, activities of daily living skills, and mobility training as each treatment session should include a functional activity. Physical and occupational therapists and therapist assistants can become certified in lymphedema therapy. Speech language therapists are seeking training as well to address facial and neck lymphedema.

Compression garments are ordered specifically for the needs and fit of the client. Compression hose or sleeves are ordered **after** the edema has been reduced and presents in a stable state. Once edema measurements are not fluctuating, compression garments may be ordered if appropriate. Skin conditions, compliance, costs, and the ability to don and doff the garments need to be considered. Clients should be fitted for their specific size and needs.

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Therapist can receive training and certification as fitters from most compression garment manufacturers. Standard white T.E.D. hose (T.E.D.™ *anti-embolism* stockings) do not provide adequate compression for mobile clients.

Pneumatic compression pumps are available for palliative care with the understanding that they only remove the interstitial water component leaving proteins behind. The interstitial proteins will draw water back into the interstitium so the edema cycle will continue. The purpose of compression pumps are to assist in reducing and maintaining limb size, and are often utilized with clients who are unable to independently use compression wraps or garments. Diuretics are often utilized by clients to assist in the removal of excessive water retention, and thus can become part of the cyclical nature of edema (Zuther, 2009). As diuretics are prescriptive and often are critical in the treatment of cardiac conditions, therapists are not to recommend the discontinuation of any medication. Refer any client concerns to their healthcare provider/referring provider.

Typical lymphedema therapy sessions are easily incorporated into standard therapy services. The duration of lymphedema therapy sessions can range from 10 minutes to over an hour depending on the client and size of limb. Frequency and duration are dependent on the client.

Typically, most lymphedema patients in the author's practice are seen up to a total of 6 visits, with an average frequency of 2 x week. Therapy is comprehensive addressing mobility, strength, range of motion (ROM), flexibility, as well as edema management. Lymphedema therapy has been shown in the author's clinical practice to be effective at reducing edema and dramatically improving ROM, mobility, and wound healing within 1-2 sessions. Lymphedema therapy can be utilized with a variety of clients and with multiple diagnoses. As a comprehensive approach is required for long term management of edema, consider incorporating other health care professionals such as dietitians, nursing, occupational therapists, and physicians to ensure all aspects of care are addressed. Once the lymphedema is consistently managed, secondary complications from swollen weeping skin, wounds, and venous stasis can be prevented. *Figure 1* presents a stage II edema with stage II wound sites which will progress unless there is intervention.



Catch lymphedema early.

Stage II edema and
Stage II wound

Figure 1 depicts edema and wound.

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Resources

Lymphedema therapy and certification information

<https://www.youtube.com/watch?v=HA3h2JcClxA>

www.lymphedemahope.com

www.lymphnet.org

www.lighthouseymphedema.org

Author Information: Julia Castleberry MS PT, DPT, CLT, GCS, NCS

Assistant Professor
Radford University's DPT Program
Address all correspondence to Joxenreid@radford.edu or
jcastleberry1@aol.com

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