



A D A P T E D F O R E U R O P E A N N U R S E S B Y E O N S

Lymphoedema

Improving symptom management in cancer care
through evidence based practice





Welcome to the Euro PEPs

The European Oncology Nursing Society is pleased to present its first set of "Putting Evidence into Practice" guidelines to improve the care of cancer patients in Europe.

Improvement in patient care is an ongoing process. There is a gap between the evidence that is available and what is actually implemented. This knowledge gap impacts on patient's in poor or inappropriate care that is detrimental to cancer patients. Results from research studies reveal that nurses insufficiently put evidence into practice. The results indicate that there are multiple reasons for why nurses do not use the latest evidence. Firstly, that research is difficult to understand, overwhelming in the amount published and secondly that they feel they don't have the expertise to interpret the quality of the evidence. If we could put even a little of what we know about symptom management into practice we would improve patient experience.

This Euro PEP has been developed as a partnership with the Oncology Nursing Society and funded by the European Commission as part of the European Action Against Cancer. Many people have contributed to the development and expert review of these documents, both in Europe and in the USA. EONS thanks their dedication and great efforts.

This documentation provides you with a concise summary of the evidence, a synthesis of patient assessments, a summary of evidence based interventions, and expert opinions to help guide you in the interpretation of European standards along with the references and source material. You may wish to adapt the guidance for your own work setting, but the PEPs gives you the confidence that these topics were reviewed in 2012 through a rigorous process by some of the leading experts and practitioners in the field.







On behalf of the review team we are confident that this information, coupled with your efforts and commitment to improve your practice, will help you achieve better, patient-centered outcomes based on scientific evidence.

We wish you great success!

Sara Faithfull
Anita Marguiles

Chair EPAAC Project
Chair PEPs

CONTENTS

Chapter icon explanations	page 5
How to use this guide	page 6
 Quick view	page 8
 Expert opinion	page 10
 Assessment tools	page 12
 Definitions	page 16
 References	page 20
 Evidence tables	(See separate section)

Putting Evidence into Practice (PEP) resources (evidence syntheses and weight of evidence categorization) are the work of the Oncology Nursing Society (ONS). Because translations from English may not always be accurate or precise, ONS disclaims any responsibility for inaccuracies in words or meaning that may occur as a result of the translation.

© European Oncology Nursing Society (2012). Authorized translation and adaptation of the English edition © 2009-2011 and open-access web materials by the Oncology Nursing Society, USA. This translation and adaptation is published and distributed by permission of the Oncology Nursing Society, the owner of all rights to publish and distribute the same.

This publication arises from the European Partnership for Action Against Cancer Joint Action, which has received funding from the European Union, in the framework of the Health Programme.

Introduction to the Sections



Quick view

The quick view provides very brief summary from the ONS PEP resources. A full copy of this is provided in the course documentation. ONS PEP information for this topic and description of the categories of evidence can be accessed at <http://www.ons.org>.



Expert opinion

Expert Opinion: low-risk interventions that are (1) consistent with sound clinical practice, (2) suggested by an expert in a peer-reviewed publication (journal or book chapter), and (3) for which limited evidence exists. An expert is an individual with peer-reviewed journal publications in the domain of interest.



Assessment tools

In general, no single tool measures all of the elements of a symptom. The choice of tool depends on the purpose of the assessment as well as the level of clinician and patient burden. Most symptoms are a subjective experience, thus self-report is the most reliable assessment method.



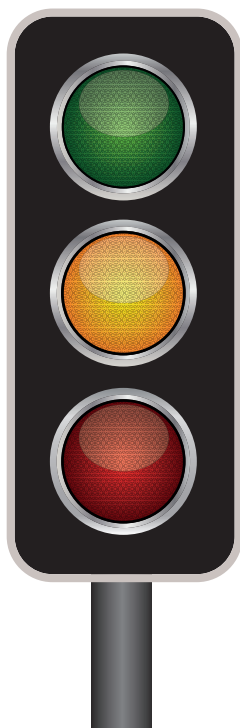
Definitions

Within the documentation various terms may need further explanation which through better understanding, could improve the outcomes of chosen interventions. The following definitions are tailored to the content of the respective PEP document.

How to use this guide

- Review the Euro - PEP resources and consider the applicability in your own practice and your patient situation.
- Do a thorough patient assessment of the relevant clinical problem(s). Examples of measurement tools are provided by the evidence-based measurement summaries, located on the individual PEP topic pages.
- Identify interventions with the highest category of evidence and integrate them into the plan of care. Consider the patient's preferences, lifestyle, and the cost and availability of the interventions.
- Evaluate and document the patient's response to the interventions. If indicated, consider implementing other interventions supported by a high level of evidence.
- Educate patients that their care is based on the best available evidence.
- The Weight of Evidence Table (traffic light) provides information about how the evidence was weighed.

Adapted for Euro PEP Resources from www.ons.org/Research/PEP



Green = Go!

The evidence supports the consideration of these interventions in practice.

Yellow = Caution!

There is not sufficient evidence to say whether these interventions are effective or not.

Red = Stop!

The evidence indicates that these interventions are either ineffective or may cause harm.

Recommended for practice

Interventions for which effectiveness has been demonstrated by strong evidence from rigorously designed studies, meta-analysis, or systematic reviews, and for which expectation of harm is small compared to the benefits.

Likely to be Effective

Interventions for which effectiveness has been demonstrated from a single rigorously conducted controlled trial, consistent supportive evidence from well-designed controlled trials using small samples, or guidelines developed from evidence and supported by expert opinion.

Benefits Balanced with Harm

Interventions for which clinicians and patients should weigh the beneficial and harmful effects according to individual circumstances and priorities.

Effectiveness Not Established

Interventions for which insufficient or conflicting data or data of inadequate quality currently exist, with no clear indication of harm.

Effectiveness Unlikely

Interventions for which lack of effectiveness has been demonstrated by negative evidence from a single rigorously conducted controlled trial, consistent negative evidence from well-designed controlled trials using small samples, or guidelines developed from evidence and supported by expert opinion.

Not Recommended for Practice

Interventions for which lack of effectiveness or harmfulness has been demonstrated by strong evidence from rigorously conducted studies, meta-analyses, or systematic reviews, or interventions where the costs, burden, or harm associated with the intervention exceed anticipated benefit.

Lymphoedema

Quick View

Definition and incidence:

Lymphedema is the accumulation of lymph fluid causing persistent swelling of the affected body part due to obstruction of the flow of fluid in the lymphatic system. In the oncology setting, the most common causes of lymphedema are radiation therapy and lymph node dissection. Lymphedema can occur in one or more extremities and can involve the corresponding quadrant of the trunk.

Lymphedema is most often reported in the upper extremities of women with breast cancer associated with axillary lymph node dissection and fibrosis after radiation therapy, however it can also affect the head and neck, breast, genitalia and lower limbs, depending upon surgeries and radiation therapy performed.

Upper extremity lymphedema occurs in 15-28% of breast cancer survivors, is most common in those who had axillary lymph node dissection and can present a few days or 6-8 weeks after surgery or radiation therapy. Lower extremity lymphedema occurs in as many as 80% of those who had lymph node dissection in the groin or those who have compression of pelvic or inguinal lymph nodes, (Marrs, 2010; Eaton & Tipton, 2009).

Approximately 20% of women develop lymphedema after breast cancer treatment, and women are at risk for its development for up to 20 years after surgery.



Recommended for practice

- Decongestive Lymphatic Therapy
- Compression bandaging
- Compression garments

Likely to be Effective

- General exercise
- Weight lifting
- Prevention and early intervention physiotherapy programmes
- Maintaining optimal body weight
- Provision of information on risk reduction behaviours
- Skin care

Benefits Balanced with Harm

- Activity restriction
- Aquatherapy

Effectiveness Not Established

- Low intensity electrostatic stimulation
- Low-level laser therapy
- Pneumatic compression pump in addition to DLT
- Stromal cell transplant
- Lymphatic venous anastomosis
- Fibrin sealant
- Simple lymph drainage
- Liposuction
- Surgical intervention

Not Recommended for Practice

- Diuretics
- Benzopyrones

Expert Opinion

Low-risk interventions that are:

- consistent with sound clinical practice
- suggested by an expert in a peer-reviewed publication (journal or book chapter) and
- for which limited evidence exists.

An expert is an individual who has authored articles published in a peer-reviewed journal in the domain of interest.

Reducing Risk of Developing Lymphedema or Exacerbating Established Lymphedema:

- Identify those at risk and monitor, including taking pre-operative measurements to establish a baseline, using a consistent approach.
- Ensure those at risk are informed about lymphedema and what they can do to minimize risk.

Skin Care

No evidence supports the role of skin care. However a common sense approach to protection of the skin is considered to be a critical component of self-care to reduce the risk of lymphedema or exacerbation of established lymphedema and to minimize the risk of cellulitis.

General Guidelines: to maintain integrity of the skin in the involved extremity

- Gentle daily washing with mild, non-perfumed soap and drying, especially between digits or folds of skin.
- Apply bland, non-perfumed moisturizer to skin daily.
- Inspect daily and treat cuts, scratches, infection promptly.
- If infection is suspected seek medical treatment promptly .
- Prophylactic antibiotics for recurrent infection.
- Protect skin from injury, e.g. gloves for gardening, cleaning, cooking, not walking barefoot or wearing comfortable shoes to avoid blisters.



- Protect skin from sunburn and insect bites.
- Avoid tight or constrictive clothing in the involved part of the body or having blood pressure taken in involved arm.
- Use only an electric razor or depilatory (following a patch test) to remove hair from affected area.
- Avoid injections in involved limb.

Exercise

Exercise and movement is important for stimulating lymphatic function, maintaining cardiovascular health, muscle strength, function and body weight. It is categorized as likely to be effective because there remains uncertainty about the type of exercise that is most beneficial and the extent to which it requires supervision. However expert opinion supports the importance of using the involved limb as normally as possible, incorporating a full range of movements, rather than over-protecting the limb. Concern that vigorous exercise will increase limb swelling is not supported by research, provided that it is built up gradually and there is a warm-up and cool-down before and after exercise. Exercise programmes should be adapted for each individual, balancing potential benefit and harm.

Other general guidelines for patients

- Maintaining optimal body weight.
- Follow guidance for air travel in respect of exercises and hydration.

- If prescribed a compression garment always wear during flights and exercise or strenuous activity.

Managing Established Lymphoedema Decongestive Lymphatic Therapy

Decongestive Lymphatic Therapy – incorporating compression bandaging initially, with compression garments for maintenance or in mild cases, manual lymphatic drainage, exercise and skin care is supported by evidence. Experts view the combination of these four elements as vital, with the exception of MLD which may be omitted or substituted with Simple Lymph Drainage for some patients. However, the only component for which there is reasonably strong evidence is compression bandaging or garments.

Compression garments are the mainstay of lymphoedema treatment but must fit well and be of appropriate compression or they may exacerbate swelling.

British Lymphology Society and Lymphoedema Support Network consensus on the management of cellulitis in lymphoedema 2010, Recommendations on prevention and treatment of cellulitis and recurrent cellulitis.

This document is regularly reviewed and updated by national UK experts and can be found at <http://www.thebls.com/docs/consensus.pdf>

Assessment Tools

The diagnosis of lymphedema is most often determined by a detailed history and clinical examination which excludes other causes of swelling and identifies characteristic skin and tissue changes. Current criteria for the staging and grading of lymphedema vary in the literature and are subjective. These variations typically reflect the diverse characteristics of swelling that occurs in different body segments or the varying intent of assessment. The International Society of Lymphology (ISL) describes four broad stages that can be used to classify lymphedema (see table currently 12.1) (ISL, 2009). Determining the appropriate treatment for patients will depend on the stage of lymphedema and the presence / absence of other problems e.g. arterial insufficiency, which would be a contra-indication for compression therapy.

Table 12-1 International Society of Lymphology Staging Criteria

Stage	Criteria
0	A latent or subclinical condition where swelling is not evident despite impaired lymph transport; it may exist months or years before overt edema occurs (stages I–III).
I	An early accumulation of fluid relatively high in protein content (e.g., in comparison with “venous” edema) and subsides with limb elevation; pitting may occur.
II	Elevation alone rarely reduces tissue swelling, and pitting is manifest. Late in stage II, the limb may or may not pit as tissue fibrosis supervenes.
III	Lymphostatic elephantiasis where pitting is absent and trophic skin changes such as acanthosis, fat deposits, and warty overgrowths develop

Note. Baesd on information from the International Society of Lymphology, 2009



A key issue is that the selected measurements, grading and assessment criteria are consistently applied to diagnose lymphedema, determine severity and to monitor the outcome of treatment strategies. (European expert group)

Early detection and intervention hold the greatest promise of reducing and managing this widespread condition (Stout Gerchich et al, 2008); Petrek, Pressman, & Smith, 2000; Rockson, 2001). Measurement in patients with cancer at baseline, prior to risk-inducing procedures such as radiation and surgery and at follow-up visits after treatment are most helpful in assessing changes over time and detecting early changes associated with emerging lymphedema. Lymphedema can occur in many areas of the body (e.g., upper extremities, lower extremities, genitals, chest, head, neck) and in patients treated for a wide variety of cancer diagnoses. Because of this, accurate measurement of lymphedema is difficult. Multiple measurement methods for lymphedema have been used in clinical and research settings. Quantitative methods include (1) water displacement (gold standard but impractical for clinical use), (2) calculation of volume based on circumferential girth via tape measurements in cm and a formula applied (Stanton et al, 2000) (3) infrared laser perometry, and (4) bioelectric impedance assessment (BIA).

Method	Population	Reliability and Validity	Comments
Patient completed questionnaire	209 patients Women = 78.7% Mean age 58 years Bilateral leg swelling – 43.8% Unilateral arm swelling – 26.8% Unilateral leg swelling	Reliability: Good correlation between visit 1 and 2 but in a small number of patients (15) who repeated the measure Face and content validity Criterion validity – good correlation with comparable domains in the EORTC QLQ – C30 for both arm and leg lymphedema but no comparison was possible in relation to appearance. Construct validity scores were compared with initial limb volume but there was no significant correlation with any of the domains.	Easy to use but questionnaire fatigue was observed on repeated measures. The impact of co-morbidities is acknowledged. Does not address midline oedema and is not recommended for children.

Lymphoedema

Circumferential measurements to determine limb volume is the most widely used method. Illustrated guidance can be found in the Lymphedema Framework International Consensus Document (2006) available on

http://www.lympho.org/mod_turbolead/upload/file/Lympho/Best_practice_20_July.pdf. (European expert group)

The Lymphoedema Framework International Consensus (2006) acknowledges that there is “no effective method for measuring oedema affecting the head and neck, breast, trunk, or genitalia” (p. 10) and recommends using digital photography to record and assess facial and genital lymphedema. Evidence-based literature also exists that supports the use of more subjective methods to measure lymphedema. Patients with limb lymphedema may experience subjective symptom changes in the absence of measurable limb volume changes demonstrating a need to recognise self-reported symptoms of heaviness and swelling (Armer, 2005). The Lymphedema and Breast Cancer Questionnaire (LBCQ) is available from Armer@Missouri.edu. Norman et al (2001) also developed a telephone questionnaire for the diagnosis of lymphedema, available in the paper or from snorman@mail.med.upenn.edu LYMQOL is a patient completed questionnaire which is available from vaughan.keeley@derbyhospitals.nhs.uk.

Name of Tool	Author/ Year	Domains or factors	Items	Scaling / Scoring	Language	How to obtain
LYMQOL	Keeley, V., Crooks, S., Locke, J., Veigas, D., Riches, K., Hilliam, R. (2010)	Function Appearance Symptoms Mood Overall QoL	28 for arm lymph- edema; 27 for leg lymph- edema	4-point Likert Scale	English	Directly from Dr Vaughan Keeley, Consultant in Palliative Medicine, Nightingale Macmillan Unit, Derby Hospice, Derby DE22 3NE at Vaughan.keeley@derbyhospitals.nhs.uk



A simple non-validated tool such as in table (currently 12.2) may be helpful in identifying those most at risk and to some extent the severity and complications arising in lymphedema.

Table 12.2. Lymphedema Assessment Guide

Assessment	Yes	No
Physical Symptoms		
Vital Signs (evidence of infection)		
Erythema or raised temperature of the involved extremity		
Skin changes, e.g. dryness, cracks, rash, fungal infection or leakage of lymph in involved extremity		
Weakness, decreased range of motion, stiffness, pain, numbness, paresthesia of the involved extremity		
Changes in fit of jewelry / clothing		
Feelings of heaviness in involved extremity		
Swelling persistent and not relieved with elevation		
Thickening or increased firmness of tissues which does not pit		
Deepened skin folds or distortion of shape due to tissue changes in involved extremity		
Risk and Contributing Factors		
Age		
Menopausal Status		
Diabetes		
Obesity		
Complete lymph node dissection		
Radiation therapy breast / adjacent to affected extremity		
Radiation therapy to axilla (in breast cancer)		
Wide radiation field		
History of recurrent infection in involved extremity		
Lack of exercise		
Haematomas, seroma, cellulitis, wounds		
Tight or constrictive clothes		
Airplane travel		
Long-distance travel		

Note. Based on information from Brown, 2004; Cope, 2006; Marrs 2007; Lymphoedema Framework 2006.

Lymphoedema Definition list

Axillary Lymph Node Dissection (ALND)

Axillary lymph node dissection (ALND) involves the removal of the lymph nodes in the axilla on the same side of the body as the breast cancer. This is done primarily to determine extent of disease prognosis, risk for recurrence, and need for adjuvant therapy and to manage the disease. ALND largely has been replaced as a primary diagnostic method by sentinel lymph node biopsy, but it may be indicated for control of disease if the sentinel lymph node(s) are found to contain tumour or if needed for further diagnostic purposes. (Chapman & Moore, 2005)

Bioimpedence

Bioimpedence measures tissue resistance to an electrical current to determine extracellular fluid volume. (Ridner et al 2007)

Body Mass Index

Body mass index (BMI) is a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems. Elevated BMI may affect risk of developing lymphedema following cancer treatment and impact progression and management of lymphedema. (CDC, 2008)

Cellulitis

Cellulitis is an acute spreading inflammation of the skin and subcutaneous tissues characterised by pain, warmth, swelling and erythema. In lymphedema, attacks are variable in presentation and, because of differences from classical cellulitis, are often called acute inflammatory episodes.

Frequently used related terms are erysipelas or lymphangitis. Most episodes are believed to be caused by Group A Streptococci but may be caused by Staph Aureus in some patients. Episodes may present with severe systemic upset, with high fever and rigors; others are milder, with minimal or no fever. Increased swelling of the affected area may occur. Inflammatory markers (CRP, ESR) may be raised. (http://www.thebls.com/patients/files/consensus_on_cellulitis_aug_10.pdf). (European expert group)

Chronic Oedema

Chronic oedema is swelling due to the excess accumulation of fluid in the tissues, which persists for more than 3 months. It tends to be soft and pitting and lessens overnight or with elevation. Chronic oedema may lead to damage of the lymphatic system. Lymphatic damage should always be suspected when the swelling does not resolve overnight or with elevation of the affected limb. However this may be difficult to determine in individuals who routinely sleep sitting in a chair (BLS 2001). (European expert group)

Complex decongestive Therapy (CDT)

See Decongestive Lymphatic Therapy

Complex Physical Therapy (CPT)

See Decongestive Lymphatic Therapy

Compression Bandaging

Compression bandaging (CB) is a specialized form of compression used in the treatment of lymphedema. Bandages are the most effective and flexible form of compression, particularly in the early stages of treatment, and they provide proper



compression when the patient is active or resting. They also can be easily adjusted to fit changing limb size and compression needs. Multiple layers of short-stretch bandages are applied to the lymphedematous area(s). Short-stretch bandages have limited extensibility under tension (50%). To achieve an effective compression gradient, bandages must be strategically applied with low to moderate tension using more layers in the distal portions of the affected limb(s). Pressure within the short-stretch bandages is low when the patient is inactive ("resting pressure"). Muscle contractions increase interstitial pressure ("working pressure") as muscles expand within the limited volume of the semi-rigid bandages. Interstitial cycling between low resting and high working pressures creates an internal pump that encourages movement of congested lymph along the distal to proximal gradient created by bandaging. The non-elastic bandage sheath also counters refilling of fluid and reduces tissue fibrosis, further reducing volume. (Moffat et al., 2006)

Compression Garment

Compression garments are used to maintain reduction in limb volume following DLT. They may also be used in mild lymphedema when the skin is intact and there are minimal subcutaneous tissue changes and the limb shape is preserved. They may either be circular knit or flat knit, each of which work in different ways. Circular knit tends to be finer and more cosmetically acceptable but are not suitable for all patients. Flat-knit produces a stiffer fabric required by many patients who have tissue changes. Most patients will require made-to-measure garments as a good fit is essential. It is important that the level of compression is appropriate and meets the German standard RAL-GZ 387/2. http://www.lympho.org/mod_turbolead/upload/file/Lympho/Template_f or_Practice_-_Compression_hosiery.pdf (European expert group)

Decongestive Lymphatic Therapy (DLT)

Decongestive Lymphatic Therapy (DLT) is a system of lymphedema treatment that includes manual lymph drainage (MLD), compression techniques, exercise, and self-care training. It is comprised of an initial reductive (intensive) phase (phase I) followed by an ongoing, individualized maintenance phase (phase II).

Components include MLD, multilayer short-stretch compression bandaging, remedial exercise, skin care, education in self-management, and elastic compression garments.

Complex Decongestive Therapy, Complex Physical Therapy or Intensive Therapy are other terms used in literature to describe the components of DLT. (Lymphoedema Framework, 2006; International Lymphoedema Framework, 2012) (European expert group)

Erysipelas

See Cellulitis

Exercise (Low intensity)

Exercise may be beneficial for all patients. Although activity and exercise may temporarily increase lymph fluid load, appropriate exercise may enable the patient with lymphedema to resume regular exercise and activity while minimizing the risk of exacerbation of the swelling. Compression garments or compression bandages must be utilized during exercise to counterbalance the excessive formation and stasis of interstitial fluid. Exercise plans must be individualized for each patient. Lymphedema exercises (decongestive exercises) are a standard and integral part of phase I and phase II decongestive lymphatic therapy programs for individuals with lymphedema. (Lymphoedema Framework, 2006)

Infrared Perometry

Perometry uses infrared light beams to measure the outline of the limb, which can then be used to calculate limb volume. (Cornish et al 1996)

Lymphoedema

Liposuction

Surgical removal of excess subcutaneous fat tissue through several small incisions, by vacuum aspiration. Must be followed up with high compression garments for life. Not suitable for most patients, (National Institute for Health and Clinical Excellence, 2008). Information can be accessed. (<http://www.nice.org.uk/guidance/liposuction>)

Low Intensity Electrostatic Stimulation

Technique of using electrostatic attraction and friction, to produce mechanical vibrations in treated tissues of the body, not only at the skin on the surface but also in deeper tissues.

Low Level Laser Therapy

Low level laser therapy (LLLT) involves the use of a hand-held infrared laser in an attempt to reduce lymphedema. (National Cancer Institute 2006)

Lymphangitis

Lymphangitis is a potentially life-threatening bacterial infection involving the lymphatic vessels that may spread to the bloodstream and often is associated with cellulitis.

Lymphedema

Lymphedema is the accumulation of lymph fluid causing persistent swelling of the affected body part due to obstruction of the flow of fluid in the lymphatic system. In the oncology setting, the most common causes of lymphedema are radiation therapy and lymph node dissection. Lymphedema can occur in one or more extremities and can involve the corresponding quadrant of the trunk. Lymphedema is most often reported in the upper extremities of women with breast cancer associated with axillary lymph node dissection and fibrosis after radiation therapy, however it can also affect the head and neck, breast, genitalia and lower limbs, depending upon surgeries and radiation therapy performed. Upper extremity lymphedema

occurs in 15-28% of breast cancer survivors, is most common in those who had axillary lymph node dissection and can present a few days or 6-8 weeks after surgery or radiation therapy. Lower extremity lymphedema occurs in as many as 80% of those who had lymph node dissection in the groin or those who have compression of pelvic or inguinal lymph nodes, (Marrs, 2010; Eaton & Tipton, 2009). The leading cause of lymphedema in the Western world today is cancer and its treatment.

As lymphedema progresses the skin becomes dry and thickened with increasing firmness of the tissues and distortion of shape. There may be leakage of lymph, hyperkeratosis or papillomatosis, especially in lower limbs. (European expert group)

Lympho-scintigraphy

Lymphoscintigraphy is an imaging procedure used to diagnose lymphedema and to identify a sentinel node for biopsy. A water-based contrast medium, which does not damage lymphatic tissues, is injected, and the flow of lymph is traced by a gamma camera. A computer then generates images based on the data gathered. (Keeley, 2006)

Manual Lymphatic Drainage (MLD)

Manual lymphatic drainage (MLD) is a treatment technique that uses a series of rhythmic light strokes to reduce swelling and improve the return of lymph to the circulatory system (Lymphoedema Framework, 2006). It is intended to encourage fluid away from congested areas by increasing activity of normal lymphatics and bypassing ineffective or obliterated lymph vessels. MLD is an integral component of complete decongestive therapy and is widely advocated based on clinical expertise, but little research data conclusively support its stand-alone use. The most appropriate techniques, optimal frequency, indications for MLD, and benefits of treatment remain to be clarified. Performing MLD is a specialized skill that requires regular practice in order to maintain competence. Deep, heavy-handed massage should be avoided



because it may damage tissues and exacerbate edema by increasing capillary filtration. (Moffat et al., 2003)

Multilayer Bandaging (MLB)

Multiple layers of short-stretch bandages are applied to the lymphedematous area(s). For more information, see the definition for Compression Bandaging.

Pneumatic Compression Pump

A pneumatic compression pump is a basic component of intermittent pneumatic compression (IPC), a widely used technique that involves attaching an electrical air compression pump to an inflatable plastic garment that is placed over the affected limb. The garment is inflated and deflated cyclically for a set period, usually about 30-120 minutes. The pressure produced by the garment can be varied. Garments may be single chambered or contain multiple chambers (usually 3, 5, or 10) that are inflated sequentially to provide a peristaltic massaging effect along the length of the limb. (Moffat et al., 2006)

Primary Lymphedema

Primary lymphedema is an congenital form of lymphedema that results from the abnormal formation of lymphatic vessels. It can develop at any time in life and most commonly leads to swelling in the feet and legs.

Secondary Lymphedema (Or Acquired)

Secondary lymphedema results from damage to the lymphatic vessels and/or lymph nodes leading to swelling in the tissues adjacent to the lymphatic structures that have been removed or damaged. Though most commonly associated with cancer treatments (e.g., surgery, radiation therapy, chemotherapy), it also can occur as a consequence of burns, trauma, venous disease, infection, inflammation, or immobility. (Moffat et al., 2006)

Sentinel Lymph Node Biopsy (SLND)

Sentinel lymph node biopsy (SLNB) is a surgical procedure during which the lymph node or nodes that receive lymphatic drainage first from the primary tumor are removed and evaluated for disease spread. SLNB is based on the idea that metastases spread first from the primary tumor to the sentinel lymph node(s) and then to other nearby lymph nodes. (NCI, 2005)

SLNs are identified through the injection of a dye and/or radiocolloid into the tumor site and then visual or radiologic identification (Chapman, 2007). If the SNLB is negative, it is unlikely that the cancer has spread to the lymph nodes and further lymph node dissection is usually not warranted. If the SNLB is positive, further lymph node removal may be indicated. (Chapman, 2007)

Simple Lymphatic Drainage (SLD) or Self Lymphatic Drainage

Simple lymphatic drainage (SLD) involves simplified self-massaging techniques performed by the person with lymphedema that normally take about 20 minutes and are done daily. If the patient is unable to perform his or her own SLD, a physical therapist or other specialist can also teach a partner, friend, or relative to perform the massage. SLD incorporates simplified hand movements in a set sequence that work across lymphatic watersheds towards functioning lymphatics. Treatment is mainly to the neck and trunk area, although the limb may be treated, depending on the needs and abilities of the patient and the condition of the limb. No oils or creams are used. (British Lymphology Society, 2001)

References

- Abbas, S., & Seitz, M. (2009). Systematic review and meta-analysis of the used surgical techniques to reduce leg lymphedema following radical inguinal nodes dissection. *Surgical Oncology*, doi:10.1016/j.suronc.2009.11.003
- Ahmed, R.L., Thomas, W., Yee, D., & Schmitz, K.H. (2006). Randomized controlled trial of weight training and lymphedema in breast cancer survivors. *Journal of Clinical Oncology*, 24(18), 2765-2772.
- Barclay, J., Vestey, J., Lambert, A., & Balmer, C. (2006). Reducing the symptoms of lymphoedema: Is there a role for aromatherapy? *European Journal of Oncology Nursing*, 10(2), 140-149.
- Bicego, D., Brown, K., Ruddick, M., Storey, D., Wong, C., & Harris, S.R. (2006). Exercise for women with or at risk for breast cancer-related lymphedema. *Physical Therapy*, 86(10), 1398-1405.
- Boccardo, F. M., Ansaldi, F., Bellini, C., Accogli, S., Taddei, G., Murdaca, G., Campisi, C. (2009). Prospective evaluation of a prevention protocol for lymphedema following surgery for breast cancer. *Lymphology*, 42(1), 1-9.
- Bordin, N. A., Guerreiro Godoy Mde, F., & Pereira de Godoy, J. M. (2009). Mechanical lymphatic drainage in the treatment of arm lymphedema. *Indian Journal of Cancer*, 46(4), 337-339. doi:10.4103/0019-509X.55556
- Box, R.C., Reul-Hirsch, H.M., Bullock-Saxton, J.E., & Furnival, C.M. (2002). Physiotherapy after breast cancer surgery: Results of a randomised controlled study to minimise lymphoedema. *Breast Cancer Research and Treatment*, 75(1), 51-64.
- Bracha J, Jacob T (2010) Using exercise classes to reduce arm lymphoedema. *Journal of Lymphoedema* 5(1) 46-55
- Carati, C.J., Anderson, S.N., Gannon, B.J., & Piller, N.B. (2003). Treatment of post-mastectomy lymphedema with low-level laser therapy. *Cancer*, 98(6), 1114-1122.
- Carlson, J. W., Kauderer, J., Walker, J. L., Gold, M. A., O'Malley, D., Tuller, E., Gynecologic Oncology Group. (2008). A randomized phase III trial of VH fibrin sealant to reduce lymphedema after inguinal lymph node dissection: a Gynecologic Oncology Group study. *Gynecologic Oncology*, 110(1), 76-82. doi:10.1016/j.ygyno.2008.03.005
- Casley-Smith, J.R. & Casley-Smith, J.R. (1996). Lymphedema initiated by aircraft flights. *Aviation, Space and Environmental Medicine*, 67 (1), 52-56.
- Chan, D. N., Lui, L. Y., & So, W. K. (2010). Effectiveness of exercise programmes on shoulder mobility and lymphoedema after axillary lymph node dissection for breast cancer: systematic review. *Journal of Advanced Nursing*, 66(9), 1902-1914. doi:10.1111/j.1365-2648.2010.05374.x
- Cheema, B., Gaul, C. A., Lane, K., & Fiatarone Singh, M. A. (2008). Progressive resistance training in breast cancer: a systematic review of clinical trials. *Breast Cancer Research and Treatment*, 109(1), 9-26. doi:10.1007/s10549-007-9638-0
- Cinar, N., Seckin, U., Keskin, D., Bodur, H., Bozkurt, B., & Cengiz, O. (2008). The effectiveness of early rehabilitation in patients with modified radical mastectomy. *Cancer Nursing*, 31(2), 160-165. doi:10.1097/01.NCC.0000305696.12873.0e
- Damstra, R. J., Brouwer, E. R., & Partsch, H. (2008). Controlled, comparative study of relation between volume changes and interface pressure under short-stretch bandages in leg lymphedema patients. *Dermatologic Surgery : Official Publication for American Society for Dermatologic Surgery [Et Al.]*, 34(6), 773-8; discussion 778-9. doi:10.1111/j.1524-4725.2008.34145.x
- Damstra, R. J., & Partsch, H. (2009). Compression therapy in breast cancer-related lymphedema: A randomized, controlled comparative study of relation between volume and interface pressure changes. *Journal of Vascular Surgery : Official Publication, the Society for Vascular Surgery [and] International Society for Cardiovascular Surgery, North American Chapter*, 49(5), 1256-1263. doi:10.1016/j.jvs.2008.12.018
- Damstra, R. J., Voesten, H. G., van Schelven, W. D., & van der Lei, B. (2009). Lymphatic venous anastomosis (LVA) for treatment of secondary arm lymphedema. A prospective study of 11 LVA procedures in 10 patients with breast cancer related lymphedema and a critical review of the literature. *Breast Cancer Research and Treatment*, 113(2), 199-206. doi:10.1007/s10549-008-
- de Rezende, L.F., Franco, R.L., de Rezende, M.F., Beletti, P.O., Morais, S.S., & Gurgel, M.S. (2006). Two exercise schemes in postoperative breast cancer: Comparison of effects on shoulder movement and lymphatic disturbance. *Tumori*, 92(1), 55-61.
- Didem, K., Ufuk, Y.S., Serdar, S., & Zumre, A. (2005). The comparison of two different physiotherapy methods in treatment of lymphedema after breast surgery. *Breast Cancer Research and Treatment*, 93(1), 49-54.
- Dirican, A., Andacoglu, O., Johnson, R., McGuire, K., Mager, L., & Soran, A. (2010). The short-term effects of low-level laser therapy in the management of breast-cancer-related lymphedema. *Supportive Care in Cancer : Official Journal of the*

- Multinational Association of Supportive Care in Cancer, doi:10.1007/s00520-010-0888-8
- Forner-Cordero, I., Munoz-Langa, J., Forner-Cordero, A., & DeMiguel-Jimeno, J. M. (2010). Predictive factors of response to decongestive therapy in patients with breast-cancer-related lymphedema. *Annals of Surgical Oncology*, 17(3), 744-751. doi:10.1245/s10434-009-0778-9
- Fu, M. R., Axelrod, D., & Haber, J. (2008). Breast-cancer-related lymphedema: information, symptoms, and risk-reduction behaviors. *Journal of Nursing Scholarship : An Official Publication of Sigma Theta Tau International Honor Society of Nursing / Sigma Theta Tau*, 40(4), 341-348. doi:10.1111/j.1547-5069.2008.00248.x
- Gergich, N.L.S Pfalzer, L.A., McGarvey, C., Springer, B., Gerber, L.H., Soballe, P.(2008)Preoperative Assessment Enables the Early Diagnosisand Successful Treatment of Lymphedema, *Cancer* 112, 2809-2819 doi: 0.1002/cncr.23494
- Gothard, L., Stanton, A., MacLaren, J., Lawrence, D., Hall, E., Mortimer, P., et al. (2004). Non-randomized phase II trial of hyperbaric oxygen therapy in patients with chronic arm lymphedema and tissue fibrosis after radiotherapy for early breast cancer. *Radiotherapy and Oncology*, 70(3), 217-224.
- Graham, P.H. (2002). Compression prophylaxis may increase the potential for flight- associated lymphoedema after breast cancer treatment. *Breast*, 11 (1), 66-71.
- Haghighat, S., Lotfi-Tokaldany, M., Yunesian, M., Akbari, M. E., Nazemi, F., & Weiss, J. (2010). Comparing two treatment methods for post mastectomy lymphedema: complex decongestive therapy alone and in combination with intermittent pneumatic compression. *Lymphology*, 43(1), 25-33.
- Hamner, J.B., & Fleming, M.D. (2007). Lymphedema therapy reduces the volume of edema and pain in patients with breast cancer. *Annals of Surgical Oncology*, 14(6), 1904-1908.
- Hayes, S. C., Reul-Hirche, H., & Turner, J. (2009). Exercise and secondary lymphedema: safety, potential benefits, and research issues. *Medicine and Science in Sports and Exercise*, 41(3), 483-489. doi:10.1249/MSS.0b013e31818b98fb
- Hou, C., Wu, X., & Jin, X. (2008). Autologous bone marrow stromal cells transplantation for the treatment of secondary arm lymphedema: a prospective controlled study in patients with breast cancer related lymphedema. *Japanese Journal of Clinical Oncology*, 38(10), 670-674. doi:10.1093/jjco/hyn090
- International Society of Lymphology. (2009). The diagnosis and treatment of peripheral lymphedema. 2009 Consensus Document of the International Society of Lymphology. *Lymphology*, 42(2), 51-60. Retrieved from <http://www.u.arizona.edu/~witte/contents/2009.42.2.concensus.pdf>
- Jahr, S., Schoppe, B., & Reisschauer, A. (2008). Effect of treatment with low-intensity and extremely low-frequency electrostatic fields (Deep Oscillation) on breast tissue and pain in patients with secondary breast lymphoedema. *Journal of Rehabilitation Medicine : Official Journal of the UEMS European Board of Physical and Rehabilitation Medicine*, 40(8), 645-650. doi:10.2340/16501977-0225
- Jeffs, E. (2006). Treating breast cancer-related lymphoedema at the London Haven: Clinical audit results. *European Journal of Oncology Nursing*, 10(1), 71-79.
- Jonsson, C., & Johansson, K. (2009). Pole walking for patients with breast cancer-related arm lymphedema. *Physiotherapy Theory and Practice*, 25(3), 165-173. doi:10.1080/09593980902776621
- Karadibak, D., Yavuzsen, T., & Saydam, S. (2008). Prospective trial of intensive decongestive physiotherapy for upper extremity lymphedema. *Journal of Surgical Oncology*, 97(7), 572-577. doi:10.1002/jso.21035
- Kasseroller, R. G., & Brenner, E. (2010). A prospective randomised study of alginate-drenched low stretch bandages as an alternative to conventional lymphologic compression bandaging. *Supportive Care in Cancer : Official Journal of the Multinational Association of Supportive Care in Cancer*, 18(3), 343-350. doi:10.1007/s00520-009-0658-7
- Kilgour, R, Jones, D. Keyserlink, J. (2008) Effectiveness of a self-administered, home-based exercise rehabilitation program for women following a modified radical mastectomy and axillary node dissection: a preliminary study, *Breast Cancer Res Treat*: 109, 285-295 DOI: 10.1007/s10549-007-9649-x
- Koul, R., Dufan, T., Russell, C., Guenther, W., Nugent, Z., Sun, X., et al. (2007). Efficacy of complete decongestive therapy and manual lymphatic drainage on treatment-related lymphedema in breast cancer. *International Journal of Radiation Oncology, Biology, Physics*, 67(3), 841-846
- Kozanoglu, E., Basaran, S., Paydas, S., & Sarpel, T. (2009). Efficacy of pneumatic compression and low-level laser therapy in the treatment of postmastectomy lymphoedema: a randomized controlled trial. *Clinical Rehabilitation*, 23(2), 117-124. doi:10.1177/0269215508096173

Lymphoedema

- Lau, R. W., & Cheing, G. L. (2009). Managing postmastectomy lymphedema with low-level laser therapy. *Photomedicine and Laser Surgery*, 27(5), 763-769. doi:10.1089/pho.2008.2330
- Leal, N. F., Carrara, H. H., Vieira, K. F., & Ferreira, C. H. (2009). Physiotherapy treatments for breast cancer-related lymphedema: a literature review. *Revista Latino-Americana De Enfermagem*, 17(5), 730-736.
- Lymphoedema Framework. (2006). Best practice for the management of lymphoedema. London: MEP Ltd.
- McClure, M. K., McClure, R. J., Day, R., & Brufsky, A. M. (2010). Randomized controlled trial of the Breast Cancer Recovery Program for women with breast cancer-related lymphedema. *The American Journal of Occupational Therapy: Official Publication of the American Occupational Therapy Association*, 64(1), 59-72.
- McNeely, M. L., Campbell, K., Ospina, M., Rowe, B. H., Dabbs, K., Klassen, T. P., Courneya, K. (2010). Exercise interventions for upper-limb dysfunction due to breast cancer treatment. *Cochrane Database of Systematic Reviews (Online)*, 6, CD005211. doi:10.1002/14651858.CD005211.pub2
- McNeely, M.L., Magee, D.J., Lees, A.W., Bagnall, K.M., Haykowsky, M., & Hanson, J. (2004).
- The addition of manual lymph drainage to compression therapy for breast cancer related lymphedema: A randomized controlled trial. *Breast Cancer Research and Treatment*, 86(2), 95-106.
- Moseley, A.L., Carati, C.J., & Piller, N.B. (2007). A systematic review of common conservative therapies for arm lymphoedema secondary to breast cancer treatment. *Annals of Oncology*, 18(4), 639-646.
- NHMRC National Breast Cancer Centre, Australia. (1997). Lymphoedema: Prevalence, risk factors and management: A review of research. The management of lymphoedema. Retrieved from <http://www.nbcc.org.au/pages/info/resource/nbccpubs/lympho/manage.htm>.
- Partschi, H., Flour, M., Smith, P. C., & International Compression Club. (2008). Indications for compression therapy in venous and lymphatic disease consensus based on experimental data and scientific evidence. Under the auspices of the IUP. *International Angiology : A Journal of the International Union of Angiology*, 27(3), 193-219.
- Pilch, U., Wozniowski, M., & Szuba, A. (2009). Influence of compression cycle time and number of sleeve chambers on upper extremity lymphedema volume reduction during intermittent pneumatic compression. *Lymphology*, 42(1), 26-35.
- Preston NJ, Seers K, Mortimer PS. (2008). Physical therapies for reducing and controlling lymphoedema of the limbs. *Cochrane Database of Systematic Reviews (Online)*, (4)(4), CD003141. doi:10.1002/14651858.CD003141.pub2
- Sagen, A., Karesen, R., & Risberg, M. A. (2009). Physical activity for the affected limb and arm lymphedema after breast cancer surgery. A prospective, randomized controlled trial with two years follow-up. *Acta Oncologica (Stockholm, Sweden)*, 48(8), 1102-1110. doi:10.3109/02841860903061683
- Sawan, S., Mugnai, R., Lopes Ade, B., Hughes, A., & Edmondson, R. J. (2009). Lower-limb lymphedema and vulval cancer: feasibility of prophylactic compression garments and validation of leg volume measurement. *International Journal of Gynecological Cancer : Official Journal of the International Gynecological Cancer Society*, 19(9), 1649-1654. doi:10.1111/IGC.0b013e3181a8446a
- Schmitz, K. H., Ahmed, R. L., Troxel, A., Cheville, A., Smith, R., Lewis-Grant, L., Greene, Q. P. (2009). Weight lifting in women with breast-cancer-related lymphedema. *The New England Journal of Medicine*, 361(7), 664-673. doi:10.1056/NEJMoa0810118
- Shaw, C., Mortimer, P., & Judd, P.A. (2007) Randomised controlled trial comparing a low-fat diet with a weight-reduction diet in breast-cancer-related lymphoedema. *Cancer* 110 (8): 1868-1874
- Stout Gergich, N.L., Pfalzer, L.A., McGarvey, C., Springer, B., Gerber, L.H., & Soballe, P. (2008). Preoperative assessment enables the early diagnosis and successful treatment of lymphedema. *Cancer*, 112(12), 2809-2819.
- Szolnoky, G., Borsos, B., Barsony, K., Balogh, M., & Kemeny, L. (2008). Complete decongestive physiotherapy with and without pneumatic compression for treatment of lipedema: a pilot study. *Lymphology*, 41(1), 40-44.
- Szuba, A., Achalu, R., & Rockson, S.G. (2002). Decongestive lymphatic therapy for patients with breast carcinoma-associated lymphedema. *Cancer*, 95(11), 2260-2267.
- Tidhar, D., & Katz-Leurer, M. (2010). Aqua lymphatic therapy in women who suffer from breast cancer treatment-related lymphedema: a randomized controlled study. *Supportive Care in Cancer : Official Journal of the Multinational Association of Supportive Care in Cancer*, 18(3), 383-392. doi:10.1007/s00520-009-0669-4
- Torres Lacombe, M., Yuste Sanchez, M. J., Zapico Goni, A., Prieto Merino, D., Mayoral del Moral, O., Cerezo Tellez, E., & Minayo Mogollon, E. (2010). Effectiveness of early physiotherapy to prevent lymphoedema after surgery for breast cancer: randomised, single blinded, clinical trial. *BMJ (Clinical Research Ed.)*, 340, b5396. doi:10.1136/bmj.b5396
- Tsai, H. J., Hung, H. C., Yang, J. L., Huang, C. S., & Tsauo, J. Y. (2009). Could Kinesio tape replace the bandage in decongestive

lymphatic therapy for breast-cancer-related lymphedema? A pilot study. *Supportive Care in Cancer : Official Journal of the Multinational Association of Supportive Care in Cancer*, 17(11), 1353-1360. doi:10.1007/s00520-009-0592-8

Vignes, S., Porcher, R., Arrault, M., & Dupuy, A. (2007). Long-term management of breast cancer-related lymphedema after intensive decongestive physiotherapy. *Breast Cancer Research and Treatment*, 101(3), 285-290.

Added references and reviews from the European expert group:

Devoogdt N., Christiaens, M.-R., Geraerts, I., Truijen, S., Smeets, A., Leunen, K., Neven, P., & Van Kampen, M. (2011) Effect of manual Lymph Drainage in addition to guidelines and exercise therapy on arm lymphoedema related to breast cancer: randomised controlled trial. *BMJ* 343:d5326 doi:10.1136/bmj.d5326; 1-12.

International Lymphoedema Framework (2012) Best Practice for the Management of Lymphoedema -2nd Ed. Compression Therapy. A position document on compression bandaging. International Lymphoedema Framework in association with the World Alliance for Wound and Lymphoedema Care. Imprimerie Reboul. France [Thhttp:// www.lympho.org/link.php](http://www.lympho.org/link.php)

Irdesel & Kahraman Celiktaş (2007) Effectiveness of exercise and compression garments in the treatment of BCRL *Turk J Phys Med Rehab* 53 16-21.

Karki A, Anttila H, Tasmuth T, Rautakorpi UM (2009) Lymphoedema therapy in breast cancer patients – a systematic review on effectiveness and a survey of current practices and costs in Finland. *Acta Oncologica* 48 (6): 850-859

Keeley, V., Crooks, S., Locke, J., Veigas, D., Riches, K., Hilliam, R. (2010) A Quality of Life Measure for Limb Lymphoedema (LYMQOL) *JoLymphoedema* 5(1):26-37

Keeley, V. (2006) The Use of Lymphoscintigraphy in the Management of Chronic Oedema *Journal of Lymphoedema*. 1(1):42-57

Kim DS, Sim Y-J, Jeong HJ, Kim GC. (2010) Effect of active resistive exercise on breast cancer-related lymphedema: a randomized controlled trial. *Arch Phys Med Rehabil* 91 1844-1848.

Lamprou, D.-A.A., Damstra, R.J. & Partsch, H. (2011) Prospective, Randomised, Controlled Trial Comparing a New Two-Component Compression System with Inelastic Multicomponent Compression Bandages in the Treatment of Leg Lymphoedema. *Dermatologic Surgery*. 37;985-991.

Omar MTA, Ebid AAEG, El Morsy AM (2011) Treatment of post-mastectomy lymphedema with laser therapy: double-blind placebo control randomized study. *Journal of Surgical Research* 165 82-90.

Oremus et al (2010) Diagnosis and Treatment of Secondary Lymphedema: Technology Assessment Report. [http:// www.cms.gov/determinationprocess/ downloads/ id66aTA.pdf](http://www.cms.gov/determinationprocess/downloads/id66aTA.pdf)

Speck RM, Courneya KS, Masse LC, Duval S, Schmitz KH (2010) An update of controlled physical activity trial in cancer survivors: a systematic review and meta-analysis. *J Cancer Surviv* 6(2):87-100

Todd, J., Scally, A., Dodwell, D., Horgan, K., Topping, A. (2008) A randomised controlled trial of two programmes of shoulder exercise following axillary node dissection for invasive breast cancer. *Physiotherapy*, 94, 265-273

Added references/guidance from the European Expert Group

LIKELY TO BE EFFECTIVE - Exercise

Author & Year

Todd et al (2008) A randomised controlled trial of two programmes of shoulder exercise following axillary node dissection for invasive breast cancer. *Physiotherapy*, 94, 265-273

Characteristics of the Intervention

Primary Aim:

to compare the incidence of treatment-related complications, including lymphoedema, after two programmes of shoulder mobilisation.

Study Procedures:

All subjects commenced programme of exercise within 48 hours. Exercises above shoulder level delayed for 7 days in Intervention group.

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample Size: 116 patients

Experimental group - 58

Control group - 58

Sample Characteristics:

Age Information 57 +/- 13.1 years

Lymphoedema

Gender Female 100% Male 0

Diagnosis Information

Women with invasive breast cancer treated surgically including axillary lymph node dissection

Other Key Characteristics Setting Characteristics

Two secondary care National health Service trusts

Location: UK

Study Design: randomised controlled trial

Measures

Lymphoedema, defined as limb volume difference of 200mls.

Limb volume measurement using water displacement

Wound drainage volumes

Range of shoulder movement (manual goniometer)

Grip strength (hand-held dynamometer)

Health-related Quality of life (Shoulder disability Questionnaire,

Functional Assessment of Cancer Therapy-Breast)

Results and Conclusions

Results:

Incidence of lymphoedema higher (statistically significant) in women introducing exercise above shoulder level within 7 days following surgery.

22 women (19%) developed lymphoedema within 12 months of surgery- 16 in control group and 6 in intervention group.

Relative Risk after early mobilisation = 2.7

No statistically significant difference in shoulder movement, grip strength or self-evaluated outcomes.

Conclusions:

A programme of exercise that delays full shoulder mobilisation for 1 week after axillary node dissection is recommended.

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations:

Small sample limited follow-up. Single site.

Although pre-operative measurements taken the pre and post-operative measurements have not been used to diagnose lymphoedema, instead comparison with unaffected limb is used, which may not be a true reflection of volume increase.

Nursing Implications:

Encouraging limb movement following axillary lymph node dissection is important but graduating this and delaying abduction and flexion above 90° for 1 week is likely to reduce incidence of lymphoedema.

Author & Year

Bracha & Jacob 2010.

Characteristics of the Intervention

Primary aim:

To assess the benefit of participation in lymphoedema-specific group exercise class.

Study procedures:

8 women with BCRL participated in weekly exercise class for 8 weeks, using Casley-Smith method of exercise and self-massage, and encouraged to do exercises at home.

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample size: 8;

Sample Characteristics:

Age: 39-71 years;

Gender: female;

Diagnosis info: post breast cancer lymphoedema;

Setting: single site; Location: Israel;

Study design: case report

Measures

Circumferential measurements of affected and unaffected limbs to calculate arm volume taken before and after each of the 8 exercise classes; quality of life using Upper Limb Lymphoedema-27 (ULL-27) questionnaire.

Results and Conclusions

Results: Limb volume reduction ranged from 0-44%; some improvement in quality of life scores.

Conclusions: The 8-week exercise class was found to be beneficial in these 8 women with BCRL.

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations: Small sample and short follow-up duration. No control group.

Nursing Implications: Exercise is safe and should be encouraged as part of treatment.

Author & Year

Kim et al 2010:

Characteristics of the Intervention

Primary aim: To investigate the differences in the effect of complex decongestive physiotherapy (CDP) with and without active resistive exercise in the treatment of BCRL.

Study procedures: RCT. 40 women randomly assigned to either the active resistive exercise (ARE) group or the nonactive resistive exercise (non-ARE) group. The ARE group underwent CDP (2 weeks by therapist and 2 weeks self-CDP) with 15min daily ARE for 5 days per week over 8 week period. The non-ARE group received CDP only for 8 weeks: 2 weeks CDP by therapist and 2 weeks self-CDP.

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample size: 40, 20 in ARE group and 20 in non-ARE group;

Sample Characteristics:

Age: 27-76 years;

Gender: female;

Diagnosis info: diagnosed BCRL;

Setting: single site;

Location: Korea;

Study design: RCT

Measures

Circumferential measurements of affected and unaffected limbs to calculate arm volume at pre-treatment and 8 weeks post treatment; quality of life assessment using Short Form-36 questionnaire.

Results and Conclusions

Results: Both groups showed significantly reduced volumes at week 8; ARE group had significantly reduced proximal arm volume but no difference between groups in distal or overall limb volume; both groups had improved QOL at 8 weeks but greater QOL improvement seen in ARE group.

Conclusions: ARE combined with CDP did not exacerbate swelling and improved proximal arm volume and QOL.

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations: Small sample and short follow-up period.

Nursing Implications: Resistive exercise is safe and should be encouraged in conjunction with lymphoedema compression therapy.

EFFECTIVENESS NOT YET ESTABLISHED - MLD as a preventative measure

Author & Year

Devoogdt et al (2011) Effect of manual Lymph drainage (MLD) in addition to guidelines and exercise therapy on arm lymphoedema related to breast cancer: randomised controlled trial.

Characteristics of the Intervention

Primary Aim:

To determine the preventative effect of manual lymph drainage on the development of lymphoedema related to breast cancer.

Study Procedures:

All patients followed a programme of exercise and general preventative care for 6 months. The intervention group (n=75) also had an average of 34 MLD treatments over 20 weeks (40 planned). Control group (n=79)

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample Size: 160 (6 of these lost to follow-up) consecutive patients, stratified for BMI and axillary irradiation.

Experimental group - 75

Control group - 79

Sample Characteristics:

Age Information: 55 +/- 13 years

Gender: 2 male; 158 female

Diagnosis Information: breast cancer with unilateral axillary node dissection

Other Key Characteristics:

Setting Characteristics:

Location: University Hospitals in Leuven, Belgium

Study Design: Stratified RCT

Measures

Cumulative incidence of arm lymphoedema and time until development defined as an increase of 200ml greater than pre-operative volume.

Volume measured by water displacement pre-operatively, then at 1,3,6 & 12 months. Subjective perception of swelling noted and additional measurements taken if this occurred.

Results and Conclusions

Results: At 12 months incidence of lymphoedema was 24% in intervention group and 19% in control group (odds ratio 1.3). Time to development was comparable in both groups.

Conclusions: MLD is unlikely to have a significant impact on reducing the incidence of arm lymphoedema in the short term .

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations: A well conducted study with pre-op measurements as baseline.

MLD did not begin until approximately 5 weeks post surgery, by which time 6 patients developed lymphoedema.

Study participants not entirely representative of the breast cancer population in terms of age or BMI so may not be generalisable.

Nursing Implications: A programme of MLD, which is labour intensive is not justified as a preventative measure.

However, more research would be useful to determine if earlier intervention with MLD or SLD was effective.

Lymphoedema

LIKELY TO BE EFFECTIVE - Compression garments

Author & Year

Hirai et al (2010)

Characteristics of the Intervention

Primary aim:

To compare the interface pressure during rest and exercise among various kinds of armsleeves in different postures.

Study procedures:

16 healthy female volunteers each wore 9 different types of armsleeve; sub-sleeve pressures recorded during slow hand opening and closing with arm i) in horizontal position, ii) arm pointing downwards, iii) arm pointing upwards.

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample size: 16;

Age: 21-23 years;

Gender: female;

Diagnosis info: healthy volunteers;

Setting: single site;

Location: Japan;

Study design: experimental, controlled comparative study

Measures

Compression measured using Air Pack Type Analyser placed over brachioradialis muscle, with pressure recordings carried out continuously at 100millisecond intervals; extensibility, stiffness and thickness of sleeves were determined.

Results and Conclusions

Results: Significant correlation between stiffness and extensibility and between stiffness and pressure difference between muscle contraction and rest: the higher the value of stiffness, the greater the pressure amplitude during exercise.

Conclusions: Short-stretch armsleeves have a high level of stiffness and are more effective in augmenting muscle pumping. Therefore they are likely to be more effective in reducing oedema than long-stretch arm sleeves.

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations: small sample of healthy volunteers. This study should be repeated with BCRL patients and the benefits monitored over time (e.g. 6 months).

Nursing Implications: Need to ensure the correct type of compression garment is prescribed for individual patients.

Author & Year

Irdesel & Kahraman Celikbas 2007

Characteristics of the Intervention

Primary Aim:

To explore the effectiveness of exercise and the use of compression garments in the treatment of BCRL.

Procedures:

RCT

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample Size: 19

Results and Conclusions

Improvement was demonstrated only in the group undertaking exercise while wearing a compression sleeve; however improvements were noted in terms of reduced circumference not volume.

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Follow-up was 6 months, which is reasonable.

Nursing Implications: Encourage exercise and activity.

EVIDENCE NOT ESTABLISHED - Weight Reduction

Author & Year

Shaw et al (2007) Randomised controlled trial comparing a low-fat diet with a weight-reduction diet in breast-cancer-related lymphoedema.

Characteristics of the Intervention

Primary Aim:

To compare the effect of 2 dietary interventions on excess arm volume in breast cancer-related lymphoedema (BCRL).

Study procedures:

Patients randomised to 1 of 3 groups

Weight reduction – individualised advice on 1000-2000 kcal diet per day.

Low-fat diet – advice on reduction of fat intake to 20% of total energy intake.

Control – advised to continue with normal diet.

All to continue for 6 months with completion of a 7-day dietary diary with photographs, at baseline and at weeks 12 and 24

Patients stratified to those whose excess limb volume was 20-50% or >50%.

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample Size: 51

Control group - 15

Weight reduction Group – 19

Low-fat diet group - 17

Sample Characteristics:

Age Information: Mean in each group – 69,67 & 59 years respectively

Gender: Male - 0 Female - 100%

Diagnosis Information: arm lymphoedema, > 20% excess volume

Other Key Characteristics:

Setting Characteristics: Oncology Centre

Location: UK

Study Design: RCT

Measures

Arm volume by perometry and circumferential measurements to calculate volume

Weight

% body fat

BMI

Skinfold thickness using Harpenden skin calipers

Results and Conclusions

Results: Significant difference in BMI, skinfold thickness, % body fat between control group and both experimental groups. There was little difference between the two experimental groups but there was a significant correlation between weight loss and a reduction in excess limb volume.

Conclusions: Weight loss whether through reduced energy intake or low-fat diet, appears to be helpful in the treatment of BCRL.

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations: Small sample. Potential for bias in reporting of dietary intake.

Nursing Implications: Patients with a high BMI and lymphoedema should be encouraged and supported to lose weight as a means of reducing swelling.

EFFECTIVENESS NOT YET ESTABLISHED - Lymphoedema Compression Bandaging – 2 layer system**Author & Year**

Lamprou et al (2011)

Characteristics of the Intervention**Primary Aim:**

To compare the effectiveness of a two-component compression (2CC) system in the treatment of leg lymphoedema with that of the traditional treatment with conventional inelastic multicomponent compression bandages (IMC).

Study Procedures:

After application of bandages patients were encouraged to move

about as much as possible. No other interventions. Bandages in both groups reapplied after 2 hours.

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample Size: 30

Experimental group – 15

Control group - 15

Sample Characteristics:

Age Information: 43-68 years

Gender: Male – 6 Female - 24

Diagnosis Information: moderate –severe unilateral leg lymphoedema (stage 11-111)

Other Key Characteristics: patients hospitalised for lymphoedema. All had previous ineffective treatment

Setting Characteristics: hospital

Location: Netherlands

Study Design: Prospective randomised controlled trial

Measures

Limb volume measurement by water displacement before application, after 2 hours, after 24 hours.

Secondary measure: changes in sub-bandage pressure and dynamic stiffness index.

Results and Conclusions

Results: No significant difference in volume reduction between the control and the study group. Similar drop in each group in sub-bandage pressure but greater DSI in the 2CC group.

Conclusion: The 2CC system is a suitable alternative to IMC in treatment of moderate to severe lymphoedema

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations: Small sample size.

Nursing implications: 2CC more expensive but there is a suggestion that less frequent bandage changes are necessary. The lighter, less bulky bandage may be preferred by patients and enable them to continue with normal activities.

EFFECTIVENESS NOT ESTABLISHED - LLLT**Author & Year**

Omar et al (2011)

Characteristics of the Intervention**Primary aim:**

To evaluate the effect of low level laser therapy (LLLT) on limb volume, shoulder mobility, and hand grip strength.

Study procedures:

50 women with BCRL were randomly assigned to either the active laser group (n=25) or the placebo group (n=25). Both

Lymphoedema

groups wore compression sleeve, undertook skin care and daily arm exercises. The laser group received LLLT 3 times/ week for 12 weeks, to 7 points on arm with total dosage of 1.5 joules/cm², and placebo group received the same protocol with a laser that had been disabled without affecting its apparent function.

Sample Characteristics, Setting Characteristics, Study Design and Conceptual Model

Sample size: 50, 25 in laser group and 25 in placebo group;

Sample Characteristics:

Age: 45-55 years;

Gender: female;

Diagnosis info: diagnosed BCRL;

Setting: single site;

Location: Egypt;

Study design: double blind RCT

Measures

Measures: At baseline and weeks 4, 8 and 12. Circumferential measurements of affected and unaffected limbs to calculate sum of circumferences; shoulder range of movement using goniometer; hand grip using dynamometer.

Results and Conclusions

Results: Trends towards improvement in both groups, however greater improvement in active laser group regarding total sum of circumferences, shoulder range of movement and grip strength.

Conclusions: LLLT appears to reduce arm circumference.

Limitations, Flaws, Cautions, Contraindications, Special Training Needs and Costs

Limitations: Small sample and short follow-up period. Limb volume should have been calculated instead of sum of circumferences. The impact of introducing exercise to both groups has not been considered.



REFERENCES

