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 Chair EPAAC Project
Anita Marguiles Chair PEPs
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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.

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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

<table>
<thead>
<tr>
<th>Green = Go!</th>
<th>The evidence supports the consideration of these interventions in practice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow = Caution!</td>
<td>There is not sufficient evidence to say whether these interventions are effective or not.</td>
</tr>
<tr>
<td>Red = Stop!</td>
<td>The evidence indicates that these interventions are either ineffective or may cause harm.</td>
</tr>
</tbody>
</table>
How to use this guide

### 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:
Lymphoedema is the accumulation of lymph fluid in the body. Secondary lymphoedema is a progressive, chronic swelling resulting from damage to the lymphatic vessels and lymph nodes, which contributes to fibrosis, skin breakdown, and increased risk of infection. Approximately 20% of women develop lymphoedema 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 anastamosis
- 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.
Assessment tools

Tools to Measure Oncology Nursing-Sensitive Outcomes: Lymphoedema (Secondary to Cancer Treatment)

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).

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.

<table>
<thead>
<tr>
<th>Name of Tool</th>
<th>Author/ Year</th>
<th>Domains or factors</th>
<th>Items</th>
<th>Scaling / Scoring</th>
<th>Language</th>
<th>How to obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>LYMQOL</td>
<td>Keeley, V., Crooks, S., Locke, J., Veigas, D., Riches, K., Hilliam, R. (2010)</td>
<td>Function Appearance Symptoms Mood Overall QoL</td>
<td>28 for arm lymphedema; 27 for leg lymphedema</td>
<td>4-point Likert Scale</td>
<td>English</td>
<td>Directly from Dr Vaughan Keeley, Consultant in Palliative Medicine, Nightingale Macmillan Unit, Derby Hospice, Derby DE22 3NE at <a href="mailto:Vaughan.keeley@derbyhospitals.nhs.uk">Vaughan.keeley@derbyhospitals.nhs.uk</a></td>
</tr>
</tbody>
</table>
**Lymphoedema**

<table>
<thead>
<tr>
<th>Method</th>
<th>Population</th>
<th>Reliability and Validity</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 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 comorbidities is acknowledged.  
Does not address midline oedema and is not recommended for children. |

**Table 12.2. International Society of Lymphology Staging Criteria**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>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).</td>
</tr>
<tr>
<td>I</td>
<td>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.</td>
</tr>
<tr>
<td>II</td>
<td>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.</td>
</tr>
<tr>
<td>III</td>
<td>Lymphostatic elephantiasis where pitting is absent and trophic skin changes such as acanthosis, fat deposits, and warty overgrowths develop</td>
</tr>
</tbody>
</table>

*Note. Based on information from International Society of Lymphology, 2003.*
A simple non-validated tool such as in table (currently 12.1) may be helpful in identifying those most at risk and to some extent the severity and complications arising in lymphedema.

**Table 12.1. Lymphedema Assessment Guide**

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

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

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)

**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 a progressive chronic condition that may appear as swelling of one or more limbs and may include the corresponding quadrant of the trunk; swelling also may affect other areas such as the head and neck, breast, or genitalia. It results from the accumulation of fluid and other elements (e.g., subcutaneous fat, protein) in the tissue spaces because of an imbalance between interstitial fluid production and lymph transport (usually low output failure) (International Society of Lymphology, 2003). Lymphedema arises from congenital malformation of the lymphatic system or damage to lymphatic vessels and/or lymph nodes (Moffat et al., 2006). 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)**
Sentinal 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


Added references and reviews from the European expert group:


Added references/guidance from the European Expert Group

LIKELY TO BE EFFECTIVE - Exercise

Author & Year

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
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 lymphedema.

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.

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 group 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 group 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

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.
**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 Celiktas 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**

**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.

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**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 1-11)
**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.

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**EFFECTIVENESS NOT YET 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
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.