Cancer Association of South Africa (CANSA)

Research • Educate • Support

Fact Sheet on Lymphoedema

Introduction

Lymphoedema is a notoriously debilitating progressive condition with currently no known cure. The unfortunate sufferer faces a lifelong struggle of medical, and sometimes surgical, treatment fraught with potentially lethal complications (Revis, *et al*.). There is no known cure for lymphoedema – it can only be controlled and controlling lymphoedema involves diligent care of the affected limb or body part.

[Picture Reference: Lymphoedema]

Lymphoedema refers to swelling that is generally mostly seen in an arm or a leg, although it can affect any other part of the body. Lymphoedema usually tends to affect just one arm or leg - sometimes both arms or both legs may be swollen. It is a swelling that develops as a result of an impaired lymphatic system. This may be as a result of the lymphatic system not developing properly, or through damage or trauma caused by surgery or radiation therapy.

Cooper-Stanton, G. 2020.

"Chronic oedema is a term that encompasses several causes that lead to oedema formation in any part of the body. This includes lymphoedema and its subcategories. Despite the assumption that these are different, there are more commonalities amongst them. This makes the transfer of knowledge and experience, from chronic oedema conditions to lymphoedema, and vice versa easier to achieve. However, this takes both time and support, to achieve the ultimate patient outcome of self-care, with generalist able to support this process and journey."

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Wedin, M., Fredrikson, M., Ahlner, E., Falk, A., Sandström, Å., Lindahl, G., Rosenberg, P. & Kjølhede, P. 2020.

Background: The aim of this study was to validate a translated Swedish version of the lymphoedema-specific quality of life questionnaire (LYMQOL) in a cohort of Swedish cancer patients with secondary lymphoedema of the limbs after cancer treatment.

Material and methods: We recruited 102 patients with lymphoedema of the arms or legs after cancer treatment who were visiting lymphoedema therapists at the departments of oncology at the university hospitals in Linköping and Umeå. The LYMQOL questionnaires were translated forward and backward from English to Swedish. Content and face validity were evaluated. The construct validity was assessed by comparing the LYMQOL with the Short Form Health Survey (SF-36) and the perceived degree of lymphoedema of the limbs, respectively. Reliability was determined through test-retest. The internal consistency was assessed by determining Cronbach's alpha and by factor analysis.

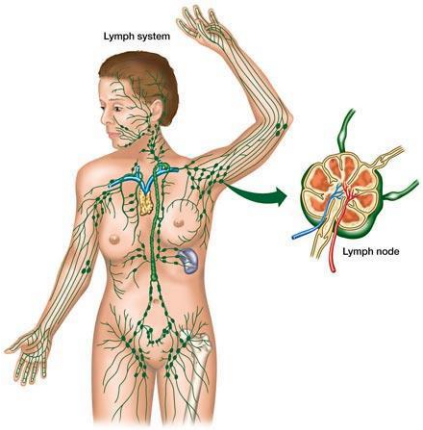
Results: The content and face validity assessments showed that LYMQOL was an easy, clear and not too long questionnaire to use for patients with lymphoedema. Construct validity was high in both versions when compared with the SF-36. The association between the degrees of perceived lymphoedema and the LYMQOL was only significant in the domains Function and Body Image in the arm version, whereas all domains in the leg version were significant. The reliability was good for the arm version (intra-class-correlation coefficients 0.53-0.87) and very good for the leg version (intra-class-correlation coefficients 0.78-0.90). The internal consistency was acceptable to excellent, with Cronbach's alpha values between 0.79-0.93 (arm-version) and 0.87-0.94 (leg-version). The factor analysis confirmed the usefulness of the four domains in the LYMQOL versions.

Conclusions: This study confirmed the validity of the Swedish version of LYMQOL and demonstrated that LYMQOL may be a simple and useful tool for use in clinical practice and scientific contexts for evaluating QoL in patients with lymphoedema of the limbs.

The Lymphatic System

The lymphatic system is a system similar to the blood circulatory system and comprises many lymphatic vessels. The main difference between the blood circulatory system and the lymphatic system is that the lymphatic vessels only contain a clear fluid, lymph. Another difference from the blood circulatory system is that blood continually circulates through each part of the body while lymph is only drained away from each part of the body.

[Picture Reference: Lymphatic System]



Oedema

Oedema is the medical term that refers to fluid retention in the body. It occurs when there is a build-up of fluid (mainly water) in the body's tissues. It causes swelling to occur in the affected area. It is often a symptom of an underlying condition. It can also be caused by a variety of factors such as high salt intake in the diet or being immobile for long periods of time. Some of the most important underlying conditions include:

- pregnancy
- kidney disease
- heart failure

- chronic lung disease
- liver disease
- diabetes
- malnutrition
- medication, such as corticosteroids or medicine for high blood pressure
- the contraceptive pill.

Incidence of Lymphoedema

It is unknown how many people in South Africa live with Lymphoedema. The unavailability of statistics is merely part of a worldwide dilemma.

In 2014, the World Health Organisation (WHO) estimated that worldwide 1-2% of the population suffers from chronic Lymphoedema

In South Africa, with the growing epidemic of non-communicable diseases, emerging infections, longer life expectancies and slow improvements of socioeconomic conditions, it is likely that the prevalence and impact of chronic wounds and Lymphoedema will increase. To put things in perspective, South Africa's population is currently said to be 56 million people; conservatively at 1-2% prevalence in the population, estimates could be as high as 1,3 million people with some form of Lymphoedema.

Lymphoedema

A medical dictionary definition of lymphoedema describes it as a common chronic and debilitating condition in which excess fluid (called lymph) collects in tissues and causes swelling (oedema) in the affected parts. The greatest problems occur in parts of the body that are not surrounded by muscle which helps pump the lymphatic system.

[Picture Credit: Awareness]

Vignes, S. 2017.

Lymphedema results from impaired lymphatic transport with increased limb volume. Lymphedema are divided in primary and secondary forms. Upper-limb lymphedema secondary to breast cancer treatment is the most frequent in France. Primary lymphedema is sporadic, rarely familial or associated with complex malformative or genetic disorders. Diagnosis of lymphedema is mainly clinical and lymphoscintigraphy is useful in primary form to assess precisely the lymphatic function of the two limbs. Erysipelas (cellulitis) is the main complication, but psychological or functional discomfort may occur throughout the course of lymphedema. Lipedema is the main differential diagnosis, defined as an abnormal accumulation of fat from hip to ankle. Lymphedema management is based on complete decongestive physiotherapy (multilayer low-stretch bandage, manual lymph drainage, skin care, exercises). The first phase of treatment leads to a reduction of lymphedema volume and the second phase stabilizes the volume. Multilayer low-stretch bandage and elastic compression is the cornerstone of the

complete decongestive physiotherapy. Patient-education programs, including self-management, aim to improve patient autonomy.

Lowering the Risk for Lymphoedema

Lymphoedema is a high protein oedema, but eating too little protein will not reduce the protein element in the lymph fluid; rather this will weaken the connective tissue and worsen the condition. The diet should contain protein that is easily digested, such as chicken and fish.

It is not always possible to totally prevent the occurrence of lymphoedema. There are, however, some steps you can take to assist in lessening the risk of developing lymphoedema:

- maintain your ideal body weight according to your build and height
- eat a well-balanced diet
- follow a low sodium diet
- ensure the intake of sufficient fibre in your diet
- avoid smoking
- do not use alcoholic beverages. If you do, limit your alcohol intake. Males should not have more than two standard alcoholic drinks per day, whereas females should not have more than one standard alcoholic drink per day.

Kilbreath SL, Ward LC, Davis GM, Degnim AC, Hackett DA, Skinner TL, Black D. 2020.

Background: Breast lymphoedema can occur following surgical treatment for breast cancer. We investigated whether an exercise program reduced breast lymphoedema symptoms compared to a non-exercise control group.

Methods: A single-blinded randomised controlled trial was conducted in which women with stable breast lymphoedema (n = 89) were randomised into an exercise (n = 41) or control (n = 47) group. The intervention comprised a 12-week combined aerobic and resistance training program, supervised weekly by an accredited exercise physiologist. All participants completed a weekly symptoms diary and were assessed monthly to ensure that there was no exacerbation of their lymphoedema. Changes in the breast were captured physically with ultrasound and bioimpedance spectroscopy and changes in symptoms were captured using European Organization for Research and Treatment of Cancer (EORTC) Breast Cancer (BR23) and Lymphoedema Symptom Intensity and Distress questionnaires.

Results: The exercise group reported a greater reduction in breast-related symptoms than the control group, assessed by the EORTC BR23 breast symptom questions. Measures of extracellular fluid, assessed with bioimpedance spectroscopy ratio, decreased in the exercise group compared to the control group. No significant difference was detected in dermal thickness in the breast, assessed by ultrasound. Session attendance in the exercise sessions was high, with two musculoskeletal adverse events reported, but no exacerbations of lymphoedema observed.

Conclusion: Combined resistance and aerobic exercise training is safe for women living with breast lymphoedema. Preliminary data suggest exercise training can reduce breast lymphoedema symptoms to a greater extent than usual care.

Caring of a Limb with Lymphoedema
Here are some simple recommendations to combat lymphoedema and to prevent its occurrence:

- Keep the affected extremity clean with moisturising soaps such as Dove©
- Keep the skin moisturised with lotions
- Use an electric razor instead of a blade on the affected extremity/armpit if you are shaving this region
- Protect the skin from the sun with sun-screen, at least SPF-15
- Use insect repellents to prevent insect bites
- Keep the extremity in an elevated position when you are resting - this lets gravity work to move the lymph fluid
- Consider wearing a compression stocking on the extremity when flying in an airplane
- Avoid hot showers, saunas, or steam rooms
- Avoid excess alcohol and smoking
- Do not have any blood pressure measurements, injections, blood draws, or vaccinations on the affected extremity
- Maintain your ideal body weight.

For an Arm:
- Wear rubber gloves when washing dishes
- Wear protective gloves when doing work outside
- Avoid carrying heavy objects with the affected arm
- Carry heavy shoulder bags on the unaffected side
- Do not get a manicure on the affected side
- Do not wear a watch or jewellery on the affected side.

For a Leg:
- Wear shoes or slippers around the house....Do not go barefoot
- Consider having a podiatrist cut your toe nails
- Get good, comfortable shoes
- Wear protective boots when doing chores outside to prevent injury.

The Treatment of Lymphoedema
There are a number of possible treatments for lymphoedema, many of which can be used together (Casley-Smith & Casley-Smith). Only basic information is furnished here – please consult your doctor or lymphoedema specialist (specially trained professional nurse, physiotherapist, etc) for additional information.

Wong, K.Y. & Furniss, D. 2020.
"Lymphoedema is the accumulation of protein-rich interstitial fluid within subcutaneous tissue and skin as a result of dysfunction of the lymphatic system. It is an underestimated, widely neglected and debilitating chronic condition."

Complex Physical Therapy
This is called Complex Physical Therapy (CPT) because a number of physical therapeutic approaches are combined to produce results. CPT consists of four (4) main parts:

- Regular skin care to improve the skin condition and to prevent any infection which will add to the lymphatic load
- A special form of massage each day, which assists in the removal of excess lymph from the tissues, softens the tissues and opens alternative lymphatic pathways so that unaffected regions can help to drain the affected region
- Compression bandages which are applied to the limb after each massage session to minimise the re-accumulation of lymph and the fitting of a compression garment after the whole treatment to stop the reduced limb from rapidly resuming its former size
- Special limb exercises which supplement the massage.

Medication
Consult your medical practitioner to prescribe specific medication. Do not use alternative or complementary medicines without discussing it with your doctor first.

Compression Garments
The use of compression garments are necessary to:

- prevent lymphoedema occurring or increasing
- try to maintain the size of an affected limb when treatment is unavailable or unaffordable
- maintain the reduction achieved after treatment, and to continue the remodelling of an affected limb.

Torres-Lacomba, M., Navarro-Brazález, B., Prieto-Gómez, V., Ferrandez, J.C., Bouchet, J.Y. & Romay-Barrero, H. 2020.
Objective: To compare the effects of four types of bandages and kinesio-tape and determine which one is the most effective in women with unilateral breast cancer-related lymphoedema.
Design: Randomized, single-blind, clinical trial.
Setting: Physiotherapy department in the Women's Health Research Group at the University of Alcalá, Madrid, Spain.
Subjects: A total of 150 women presenting breast-cancer-related lymphoedema.
Interventions: Participants were randomized into five groups (n = 30). All women received an intensive phase of complex decongestive physiotherapy including manual lymphatic drainage, pneumatic compression therapy, therapeutic education, active therapeutic exercise and bandaging. The only difference between the groups was the bandage or tape applied (multilayer; simplified multilayer; cohesive; adhesive; kinesio-tape).
Main measurements: The main outcome was percentage excess volume change. Other outcomes measured were heaviness and tightness symptoms, and bandage or tape perceived comfort. Data were collected at baseline and finishing interventions.
Results: This study showed significant differences between the bandage groups in absolute value of excess volume (P < 0.001). The most effective were the simplified multilayer (59.5%, IQR = 28.7) and the cohesive bandages (46.3%, IQR = 39). The bandages/tape with the least difference were kinesio-tape (4.9%, IQR = 17.7) and adhesive bandage (21.7%, IQR = 17.9). The five groups exhibited a

significant decrease in symptoms after interventions, with no differences between groups. In addition, kinesio-tape was perceived as the most comfortable by women and multilayer as the most uncomfortable ($P < 0.001$).

Conclusion: Simplified multilayer seems more effective and more comfortable than multilayer bandage. Cohesive bandage seems as effective as simplified multilayer and multilayer bandage. Kinesio taping seems the least effective.

If no other treatment is used, good compression garments will limit the amount of swelling and thereby slow the advancement of lymphoedema.

[Picture Credit: Compression Garment]

Compression Bandages

The use of compression bandages are essential during complex lymphatic therapy since the limb's size changes rapidly and so the size of the compression 'garment' and the amount of compressionh must also change rapidly. This is necessary partly because of the destruction of the elastic fibres of the skin in lymphoedema, to maintain the reductions gained by massage in the newly lax tissues, and to reshape the affected limb.

Compression bandages should only be applied by specially trained and competent individuals.

The use of Pneumatic Pumps in Treating Lymphoedema

Pneumatic compression pumps are proposed as a treatment option for patients with lymphoedema who have failed conservative measures e.g., compression garments and manual massage. A variety of different pumps are available. It can be single- or multi-chamber pumps, and have varying design and complexity. This type of device should only be used on the recommendation and under supervision of a qualified person.

[Picture Credit: Lymphoedema Pump]

A pneumatic compression garment paired with a pump producing various pressure gradients simulates normal actions of the circulatory system by using external pressure. Inflation of the garment both proximally and distally produces pressure causing lymphatic fluids or blood to circulate out of the affected limb, reducing swelling and preventing potential blood clots and wounds from forming. There are pneumatic compression garments available for application to limbs as well as the torso.

Tastaban, E., Soyder, A., Aydin, E., Sendur, O.F., Turan, Y., Ture, M. & Bilgen, M. 2020.
Objective: To evaluate the role of intermittent pneumatic compression in the treatment of breast cancer-related lymphoedema.
Design: Randomized controlled trial.
Setting: Physical medicine and rehabilitation clinic at a university hospital.
Subjects: Seventy-six patients with lymphoedema.
Interventions: Patients were allocated into Group 1 (complex decongestive treatment, *n* = 38) and Group 2 (complex decongestive treatment + intermittent pneumatic compression, *n* = 38). The complex decongestive treatment involved skin care, manual lymphatic drainage, compression bandaging, and exercise for 20 sessions. Group 2 additionally received intermittent pneumatic compression.
Main measures: Quantitative outcomes consisted of volumetric measures prior to and after the treatment. Clinical assessments included severity of pain, heaviness and tightness, disability, grip strength, and depression.
Results: Lymphoedema was similar at baseline, but treatments significantly reduced the excess volume (from 373 mL to 203 mL in Group 1 and 379.5 mL to 189.5 mL in Group 2). Percentage excess volumes (PEVs) decreased in both groups. The percentage reduction of excess volume was better in Group 2 than Group 1, but the intergroup difference was not significant. The clinical scores reflected improvements, but the heaviness and tightness read significantly lower in Group 2 than Group 1.
Conclusion: Intermittent pneumatic compression seems to add no benefit when combined with complex decongestive treatment of lymphoedema, but, may be functional in reducing the sensations of heaviness and tightness for the patients with pitting oedema.

Exercise
A specific exercise program, designed to assist the lymph drainage from your swollen limb is an important part of your overall management for lymphoedema and something that you can do to help yourself.

During exercise, the muscle contraction that occurs when the muscles are tensed puts increased pressure on the lymph vessels. This “muscle pump” squeezes the vessels to enhance the lymphatic pumping mechanism (see diagram), which in turn helps to move lymph fluid into and along the lymph vessels, back towards the chest and away from the affected area. There are one-way valves in the deeper lymphatic vessels which help stop backflow and help to direct the lymph fluid centrally away from the limbs towards the trunk. Specific exercises thus help to drain fluid out of a swollen limb. Exercises are also important to maintain mobility of the joints and to stretch and strengthen muscles.

When exercising, remember the following:
- Perform exercises slowly and smoothly, in a gentle manner, it should not be painful
- Wear bandages/compression sleeve while exercising if available – this will further enhance the pumping action of the lymphatic vessels
- Exercises start with the trunk to help with lymph drainage centrally, followed by exercises of the affected limb
- An exercise programme should always be tailored to an individual and will depend on their age, occupation, lifestyle, level of fitness and current health
- Always get a doctor or lymphoedema therapist’s approval and guidance for any exercise programme. If any exercise seems to cause any problems or seems to result in further swelling, STOP, and seek professional advice.

Gutierrez, C., Karni, R.J., Naqvi, S., Aldrich, M.B., Zhu, B., Morrow, J.R., Sevick-Muraca, E.M. & Rasmussen, J.C. 2019.
"Ten head and neck cancer survivors diagnosed with head and neck lymphedema (HNL) were imaged using near-infrared fluorescence lymphatic imaging (NIRFLI) prior to and immediately after an initial advance pneumatic compression device treatment and again after 2 weeks of daily at-home use. Images assessed the impact of pneumatic compression therapy on lymphatic drainage. Facial composite measurement scores assessed reduction/increase in external swelling, and survey results were obtained. After a single pneumatic compression treatment, NIRFLI showed enhanced lymphatic uptake and drainage in all subjects. After 2 weeks of daily treatment, areas of dermal backflow disappeared or were reduced in 6 of 8 subjects presenting with backflow. In general, reductions in facial composite measurement scores tracked with reductions in backflow and subject-reported improvements; however, studies are needed to determine whether longer treatment durations can be impactful and whether advanced pneumatic compression can be used to ameliorate backflow characteristic of HNL."

Invernizzi, M., Michelotti, A., Noale, M., Lopez, G., Runza, L., Giroda, M., Despini, L., Blundo, C., Maggi, S., Gambini, D. & Fusco, N. 2019.
"Breast cancer related lymphedema (BCRL) is frequent but strategies for an individualized risk assessment are lacking. We aimed to define whether tumor-specific pathological features, coupled with clinical and therapeutic data, could help identify patients at risk. Data from 368 patients with node-positive breast cancers were retrospectively collected, including 75 patients with BCRL (0.4–25.6 years follow-up). BCRL was assessed during the standard follow-up oncology visits using the circumferential measurement. Clinicopathologic and therapeutic factors associated with BCRL were integrated into a Cox proportional hazards regression model. Lymphovascular invasion (LVI) was more common in BCRL patients (n = 33, 44% vs. n= 85, 29%, p = 0.01), akin extra nodal extension (ENE) of the metastasis (n = 57, 76% vs. n = 180, 61%, p = 0.02). Sentinel lymph node excision without axillary dissection and extra-axillary radiotherapy were BCRL-unrelated. A higher number of BCRL-positive patients were treated with taxane-based chemotherapy with or without trastuzumab, compared to BCRL-negative patients (p < 0.01). Treatment with trastuzumab and/or taxanes, adjusted for systemic infections, laterality, therapy, and pathological features (i.e., LVI and ENE), had a significant impact in BCRL-free survival (p < 0.01). This work offers new insights on BCRL risk stratification, where the integration of clinical, therapeutic, and tumor-specific pathological data suggests a possible role of anti-human epidermal growth factor receptor 2 (HER2) therapy in BCRL pathogenesis."

Brahma, B. & Yamamoto, T. 2019.
"Breast cancer is the most common cancer in Dharmais hospital. The treatment can give rise to breast cancer treatment-related lymphedema (BCRL) that will cause significant morbidities. Based on author's (BB) patient series in Dharmais hospital, BCRL occurred in 27.7% after axillary lymph nodes dissection (ALND). The development of diagnostic modalities as well as lymphatic microsurgery have become promising instruments for lymphedema treatment."

Complimentary Treatment - Acupuncture
Yu, S., Zhu, L., Xie, P., Jiang, S., Yang, Z., He, J. & Ren, Y. 2020.
Background: Lymphoedema is a common complication of axillary dissection surgery, especially for breast cancer patients. Approximately 20% of breast cancer survivors develop breast cancer-related lymphoedema (BCRL). Acupuncture (AC) has become an alternative treatment for BCRL. In this

study, we investigated whether AC was a good method for treating limb oedema in women after breast cancer surgery.
Methods: We performed a systematic review and meta-analysis of published randomized controlled trials (RCTs) to evaluate the effectiveness of AC in the prevention of BCRL. Searching strategies were performed with the following keywords: "Breast cancer," "Acupuncture," "neoplasm," and "lymphoedema," with derivations and different combinations of these keywords. The following databases were searched: PubMed, Cochrane Library, EMBASE, Web of Science, CNKI, WanFang, and CBM. Studies published in English and Chinese were considered for inclusion in this study. Study selection, risk of bias assessment and data extraction were independently conducted. Statistical analyses were conducted with RevMan software (version 5.3).
Results: Eight studies were identified by the search strategy, and 519 patients were included in this study. The effective rate was higher (odds ratios (OR): 4.23; 95% confidence interval (CI): 2.11 to 8.49; Z = 4.07, p < 0.0001) in the experimental group than that in the control group. There were no significant improvements in the front flexion (mean difference (MD): 0.19; 95% CI: -3.68 to 4.06; Z = 0.09, p = 0.92) or the back extension (MD: 0.42; 95% CI: -2.22 to 3.06; Z = 0.31, p = 0.75) movements of the shoulder between the experimental and control groups.
Conclusions: AC may be an effective method for improving the condition of breast cancer-related lymphoedema. However, due to the high risk of bias and the low quality of the available studies, further high-quality RCTs are needed to confirm the efficacy of AC for breast cancer-related lymphoedema patients.

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