Cancer Association of South Africa (CANSA)

CANSA 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.

Bott, T. 2022. Lymphoedema and cancer: an overview. Br J Nurs. 2022 Feb 10;31(3):120-122.
"Secondary lymphoedema is a common concern for people with cancer. Trevor Bott, Clinical Trials Database Nurse, Cancer Research UK (Trevor.Bott@cancer.org.uk) discusses the links and its impact on quality of life."

Thomas, M., Gabe-Walters, M. & Coveney, E. 2022.
Background: Lymphoedema is a chronic condition that requires lifelong, time-consuming and laborious management. It can have significant effects on physical, psychological and social well-being. Children and young people with lymphoedema require access to expert services to aid early diagnosis and referral for assessment and treatment.

Aim: To explore the perspectives of children and young people living with lymphoedema and those of their families, as well as their experiences of the national paediatric lymphoedema service in Wales.
Method: A qualitative approach was adopted using semi-structured interviews with participants who had been referred to the national paediatric lymphoedema service in Wales.
Findings: A total of 15 families were interviewed. Five themes were identified: lack of professional awareness of paediatric lymphoedema; a journey to diagnosis as lost in the system; 'being me' - what it feels like to have lymphoedema; managing lymphoedema and feeling supported; and the benefits of a national paediatric lymphoedema service. Two sub-themes were identified within the 'being me' theme - body image and self-esteem, and loss of control.
Conclusion: Lymphoedema has a profound effect on daily life, body image and self-esteem. Participants tended to be resilient and determined to continue with their lives. Importantly, they valued being under the care of a service that understood their condition.

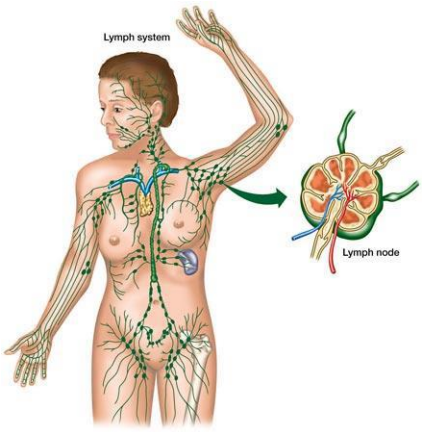
Cooper-Stanton, G. 2020.
"Chronic oedema is a term that encompasses several causes that lead to oedema formation in any part of the body. This includes lymphoedema and its subcategories. Despite the assumption that these are different, there are more commonalities amongst them. This makes the transfer 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."

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]

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.

Martínez-Jaimez, P., Armora Verdú, M., Forero, C.G., Álvarez Salazar, S., Fuster Linares, P., Monforte-Royo, C. & Masia, J. 2022.

Aims: To identify the risk factors for lymphoedema following axillary lymph node dissection (ALND) in a European sample and to propose a lymphoedema prediction model for this population.

Design: Predictive retrospective cohort study comparing women who developed lymphoedema in 2 years of undergoing ALND with those who did not developed lymphoedema.

Methods: We reviewed the clinical records of 504 women who, between January 2008 and May 2018, underwent surgery for breast cancer that involved ALND. Logistic regression was used to identify significant risk factors for lymphoedema. The prediction accuracy of the model was assessed by calculating the area under the receiver operating characteristic curve.

Results: Of the 504 women whose records were analysed, 156 developed lymphoedema. Significant predictors identified in the regression model were level of lymph node dissection, lymph node status, post-operative complications, body mass index (BMI) and number of lymph nodes extracted. The prediction model showed good sensitivity (80%) in the study population.

Conclusions: The factor contributing most to the risk of lymphoedema was the level of lymph node dissection, and the only patient-related factor in the prediction model was BMI. The model offers good predictive capacity in this population and it is a simple tool that breast care units could use to assess the risk of lymphoedema following ALND. Nurses with specialist knowledge of lymphoedema have a key role to play in ensuring that women receive holistic and individualized care.

Impact: What problem did the study address? Secondary lymphoedema is one of the main complications in the treatment of breast cancer. What were the main findings? The prediction

model included five factors associated with the risk of lymphoedema following ALND. The strongest predictor was the level of lymph node dissection, and the only patient-related factor was BMI. Where and on whom will the research have an impact? The prediction model offers breast care units a tool for assessing the risk of lymphoedema in women undergoing surgery involving ALND. The results highlight the importance of weight reduction as a preventive measure and support a more conservative surgical approach.

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.

Huang, Y.Y., Toh, P.Y., Hunt, C., Lin, J.T.W., Kamyab, R. & Ponniah, A.K. 2022.

Aim: Recent surgical de-escalation of the axilla in breast cancer management has led to reduced number of immediate and delayed axillary lymph node dissections (ALND) after sentinel lymph node biopsies (SLNBs). We aim to assess the postoperative impact of SLNB versus immediate and delayed ALND on arm lymphoedema and morbidity.

Methods: A retrospective analysis from a prospectively collected institutional database was performed reviewing the rates of lymphoedema and arm morbidity in terms of shoulder restriction and patient-reported functional deficit in women undergoing axillary surgery for breast cancer between 2013 and 2018.

Results: In this 776 patient cohort (564 SLNBs, 192 immediate ALNDs and 20 delayed ALNDs), at 12 months after surgery, the results are as follows: lymphoedema rate: SLNB (4.62%), immediate ALND (19.51%), delayed ALND (15.00%); axillary cording rate: SLNB (3.08%), immediate ALND (10.65%), delayed ALND (5.00%); new functional deficit: SLNB (5.58%), immediate ALND (13.66%) and delayed ALND (20%); pain SLNB (14.02%), immediate ALND (15.97%), delayed ALND (17.65%); shoulder flexion/abduction restrictions: SLNB (8.14%/5.14%), immediate ALND (16.45%/15.79%) and delayed ALND (17.65%/20.00%). ALND was associated with increased risk of developing lymphoedema, shoulder dysfunction and development of more than one morbidity. No statistically significant difference in lymphoedema and morbidity outcome was observed between immediate and delayed ALND.

Conclusion: Immediate and delayed ALND have comparable outcomes, but both are associated with increased postoperative arm lymphoedema and morbidity outcomes compared to SLNB alone.

Preoperative appropriate selection of patients for axillary surgery treatment may improve lymphoedema outcomes in breast cancer patients.

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.

Brown, S., Dayan, J.H., Coriddi, M., Campbell, A., Kuonqui, K., Shin, J., Park, H.J., Mehrara, B.J. & Kataru, R.P. 2022.
"Lymphedema is a chronic disease that results in swelling and decreased function due to abnormal lymphatic fluid clearance and chronic inflammation. In Western countries, lymphedema most commonly develops following an iatrogenic injury to the lymphatic system during cancer treatment. It is estimated that as many as 10 million patients suffer from lymphedema in the United States alone. Current treatments for lymphedema are palliative in nature, relying on compression garments and physical therapy to decrease interstitial fluid accumulation in the affected extremity. However, recent discoveries have increased the hopes of therapeutic interventions that may promote lymphatic regeneration and function. The purpose of this review is to summarize current experimental pharmacological strategies in the treatment of lymphedema."

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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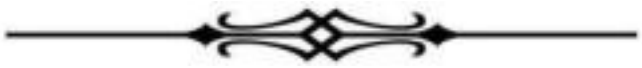

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Compression Garment
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