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Benefits of Lymphatic Drainage Manual In Lymphedema Treatment In Post-Mastectomy Women: Integrative Review

Aline Maciel de Oliveira[1]; Valeria Ferreira dos Santos[2]; Bruna Rafaela Dornelas de Andrade Lima Monteiro[3]; Sâmia Dayana Lemos de Lacerda[4]; Maria Rosana de Souza Ferreira*[5].

1 – 2 Student at UNIFACOL, Vitória de Santo Antão, Pernambuco, Brazil.
3 Professor at UNIFACOL – Centro Universitário FACOL Faculdade Escritor Osman Lins, Vitória de Santo Antão, Pernambuco, Brazil. PhD student of the Graduate Program in Therapeutic Innovations.
4 Professor at UNIFACOL - University Center FACOL Faculty Writer Osman Lins, Vitória de Santo Antão, Pernambuco, Brazil. PhD student of the Graduate Program in Therapeutic Innovations.
5 Master professor and Advisor of the Bachelor's Degree in Physiotherapy from UNIFACOL-University Center FACOL Faculty Writer Osman Lins, Vitória de Santo Antão, Pernambuco, Brazil.

E-mail adresses: alinemaciel06@bol.com.br (Aline Maciel de Oliveira), valeria13.01@hotmail.com (Valeria Ferreira dos Santos), brunadornelasmonteiro@gmail.com (Bruna Rafaela Dornelas de Andrade Lima Monteiro), samia.lacerda@ufpe.br (Sâmia Dayana Lemos de Lacerda), ferreira.rosanasouza@gmail.com (Maria Rosana de Souza Ferreira),
*Corresponding author

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Abstract: Given the great impact that breast cancer has on women, especially after mastectomy, this theme is relevant based on the longing to help and bring a better recovery with a view to reducing edema caused by the surgical procedure, contributing to physical and psychological improvements for patients. This study aims to identify the benefits of lymphatic drainage in the postoperative period of mastectomy. The present study refers to a literature review, for which articles indexed in the databases "VHL", "SCIELO" and PUBMED were selected. The keywords used were "mastectomy"; "drainage" and "lymphedema". The inclusion criteria in this research were the literature reviews made between 2004 and 2021, written in Portuguese and English and whose study was done with women. Several benefits of physiotherapy treatment were identified through manual lymphatic drainage technique such as pain relief, lymph node clearance and conduction to an area.

Keywords: Lymphatic drainage. Mastectomy. Physical therapy.

1. Introduction

Breast cancer is a disease caused by the disordered multiplication of breast cells and is the type of pathology that most affects women. This process generates abnormal cells that multiply, forming a tumor. Due to a wide variety of types of breast cancer, the disease can evolve in different ways. Some have rapid development, while others grow more slowly. These distinct behaviors are due to the characteristics of each tumor and of each patient.[1]

In 2020, 66,280 new cases of the disease were diagnosed, representing 29.7% of the total cases, adding up to the main types of cancer in the female gender. The mortality rate due to breast cancer in women is also the highest among the other types and in 2020 reached the mark of 17,572 deaths, representing 16.4% of the total deaths according to the initial location of the tumor. [1]

The involvement of breast cancer and its treatment generate serious consequences, temporary or permanent, in the life of the woman. Breast surgery, even though accompanied by breast reconstruction, can be experienced in a traumatic way by the patient. In addition, upper limb functionality may be compromised with arm lymphedema that arises after dissection of the axillary lymph nodes. [2]

Radical mastectomy consists of total removal of the breast, axillary lymph nodes and pectoral muscles, having as one of its complications lymphedema, which occurs when the body lymph retains in the soft tissues of the body, usually in the arm or leg, due to obstruction of the lymphatic system. With this, patients may present symptoms such as edema, feeling of heavy arms, discomfort and sensory changes. [3]

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There are some sequelae and complications, among them the most common is lymphedema, which is defined as a chronic and progressive pathological condition, where there is an excessive accumulation of interstitial fluid, rich in proteins. This complication can lead to distensibility of the subcutaneous tissue of the structures involved, such as shoulder, elbow, wrist and hand on the compromised side, impairing movements and causing decreased range of motion, postural deformity of the trunk, decreased muscle strength, pain and increased weight of the affected limb. Mastectomized patients who do not undergo treatment for this complication, edema can progress, worsening to a permanent condition resistant to its treatment. [4]

The choice of surgical intervention includes conservative and radical approach, which will vary according to the type, stage, size and location of the tumor, along with other therapies, if necessary: chemotherapy, radiotherapy, hormone therapy and immunotherapy, which can be combined or isolated. It is an invasive treatment that results in both physical and psychological impact and may aim at staging the tumor, preventing metastasis and increasing patient survival. Surgery may result in complications such as lymphedema, postural alteration, loss or decrease in function, pain in the homolateral limb, infection, skin necrosis, seroma, scar adhesions, limitation of shoulder range of motion, axillary cord, sensory alteration, motor and/or sensory nerve injury, muscle weakness, and myofascial dysfunction. [5]

Post-mastectomy lymphedema can arise by combining primary (elements involving the surgical process, such as the type of surgery and the technique used) or secondary (when they occur after breast surgery, such as axillary radiotherapy, obesity, age, scar complication, postoperative upper limb immobilization). And the consequences of surgical factors are sensory changes, fibroedema, lymphangitis, seroma, pain, limitation of range of motion (ROM), infection, lymphedema, functional impairment to the affected limb and dismay with body and emotional image. [4]

Even with the change in prognosis, through advances, especially technological, in the diagnosis and treatment of breast cancer, women's responses to the onset of the disease include fear of disfigurement and loss of sexual activity, which is directly linked with their breasts. [6]

The physical therapy treatment in these patients aims at controlling and reducing edema, as well as preventing circulatory and musculoskeletal complications, avoiding keloid, scarring and adhesions, promoting postural reeducation, improving ROM, preventing associated infections, improving activities of daily living (ADLs) and the psychosocial aspect. [4]

Mastectomy is one of the main forms of treatment for locoregional control of the disease, preventing it from going to other areas of the body. On the other hand, it is one of the most aggressive resources in relation to the image of women, which can cause psychosocial damage, decreased self-esteem, even affects sexuality, and may even develop depression. Therefore, multidisciplinary follow-up is highly recommended for treatment. [7]

Mastectomy is one of the forms of breast cancer treatment. The procedure consists of partial or total removal of the breast and everything involving the mammary glands. Breast reconstruction should always be considered after mastectomy. [8]

The postoperative period of breast cancer, the physiotherapist has a diversity of resources to promote improvements in the patient's condition, and thus contribute to the non-complications of the immediate postoperative period, such as movement deficit due to joint causes or some type of disorder resulting from physical and emotional factors. [7]

Due to the cutting of tissue or muscle, in the surgical procedure, cells and blood vessels rupture, generating accumulation of fluid at the site. Therefore, it is indicated the use of Manual Lymphatic Drainage (MDL) in order to contribute to the removal of this liquid, avoiding possible edemas. [9]

Lymphatic drainage arose in France, through Emil and Estrid Vodder. They observed that many people had an increase in lymph nodes in the cervical region as a result of chronic flu-like cases. The couple provided the improvement of these conditions with certain types of physical stimulation movement (massages) performed in the region involved. From these observations, the manual lymphatic drainage technique was developed, with the systematization of some types of movements and the orientation of the drainage direction. [10]

Manual lymphatic drainage (MDL) has the function of evacuating excessive accumulation of interstitial fluid through the lymphatic system. Drainage is a massage technique with slow movements, gentle and with constant rhythm in the skin, following the anatomical paths of the lymphatic system, with the objective of draining excess fluid in the interstitium, in the tissue and inside the vessels, through the anastomoses, improving the motricity of the capillaries and dissolving lymphostatic fibrosis. [4]

Manual Lymphatic Drainage (MDL) uses surface maneuvers, performed at a slow and continuous pace so that the lymph is gradually and harmoniously conducted. It should always be initiated with the evacuation or unlocking of the proximal regions compromised through the pumping maneuver, followed distally to the affected regions through manual stimuli, increasing the motricity of the lymphangion and, consequently, the lymphatic flow. [11]

Given the great impact that breast cancer has on women, especially after mastectomy, this theme is relevant from the longing to help and bring a better recovery with a view to reducing edema caused by the surgical procedure, contributing to physical and psychological improvements for patients.

Thus, this study aims to identify the benefits of lymphatic drainage in the postoperative period of mastectomy.

2. Methodology

The present study refers to an integrative review, for which articles indexed in the databases "VHL", "SCIELO" and 'PUBMED" were selected. The descriptors used were "mastectomy"; "manual lymphatic drainage" and "lymphedema". Articles published between 2004 and 2021,

written in the Portuguese english and whose study was conducted with human women, were used as inclusion criteria in this research. Articles in Spanish and an unconducted study with human women were not included. In all, 24 articles were found. After observing the date of publication and reading of the titles and abstracts, 15 publications were excluded. Of these, 09 were used for this integrative review.

3. Results

The flowchart below presents the order of analysis of the articles found, selected and included in the research:

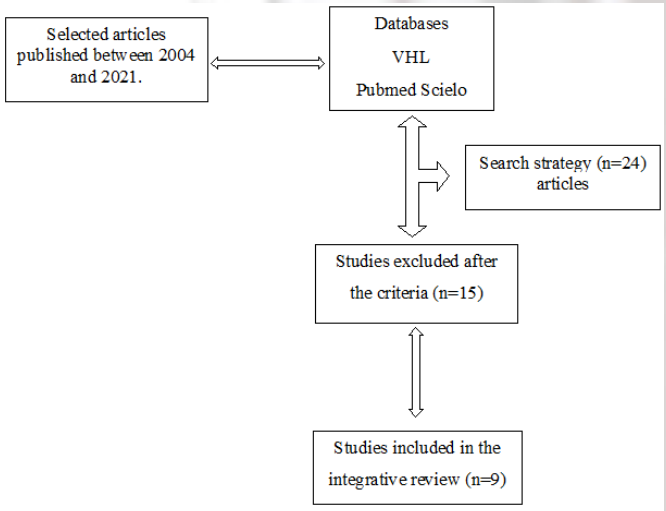

Figure 1. Flowchart of the article selection process. Source: Author database (2021).

The following table displays the selected articles according to the inclusion criteria:

Table 1. Analysis of the characteristics and results of the studies.

AUTHOR (YEAR)	TITLE	GOAL	CONCLUSION
MONTEIRO; ALMEIDA (2020)[13]	Lymphatic drainage in the treatment of lymphedema in mastectomized women.	Describe the role of lymphatic drainage in the treatment of lymphedema, through lymphatic drainage.	The application of manual lymphatic drainage (MDL) in mastectomized women is very effective in the treatment of lymphedema considering that the excess of fluid extravasated in a continuous and chronic way can find ways of returning to the vessels due to intermittent, mild, slow pressures from distal to proximal region, exercised by the physiotherapist, always done according to the path of the lymphatic system.
MARTÍN, *et al.* (2011) [14]	Manual lymphatic drainage therapy in patients with breast cancer related lymphoedema	The aim of this study is to analyze the efficacy of Manual Lymphatic Drainage in the treatment of post-matose lymphoedema in order to reduce lymphoedema volume and evaluate symptomatology improvement.	The results of this study will provide information on the efficacy of Manual Lymphatic Drainage and its impact on the quality of life and physical limitations of these patients.
GURDAL et al. (2012) [15]	Comparison of intermittent pneumatic compression with manual lymphatic drainage for breast cancer-related lymphedema treatment.	The objective of this prospective controlled study was to evaluate the efficacy of two different modalities of combined lymphedema (LE) treatment. Manual lymphatic drainage (MLD) and the combination of compression dressings (complex decongestive therapy) were compared with intermittent pneumatic compression (PCI) plus auto lymphatic drainage (LDS).	Different treatment modalities consisting of MLD and compression dressing (complex decongestive therapy) or PCI and SLD seem to be effective in the treatment of LE with similar therapeutic efficacy in breast cancer patients. However, combination modalities, including IPC and SLD, may be the preferred choices for your applicability at home.
Melam GR, *et al.* (2016). [16]	Effect of complete decongestive therapy and home program on health-related quality of life in post mastectomy lymphedema patients	The aim of this study is to evaluate the effect of adding an exercise component and a home program for complete decongestive therapy on health-related quality of life in patients with post-mastectomy lymphedema.	In this study, corrective exercises and home program, in addition to manual lymphatic drainage and compression bandage, resulted in a better quality of life. Early identification of lymphedema and incorporation of corrective exercises and a home program improve the quality of life of breast cancer survivors.

MCNEELY ML, *et al*. (2004). [17]	The addition of manual lymphatic drainage to compression therapy for breast cancer related lymphedema: a randomized controlled trial	The aim of this investigation was to compare the reduction of arm lymphedema volume obtained from manual lymphatic drainage massage (MLD) in combination with multilayer compression bandage (CB) with that obtained only by CB.	These findings indicate that CB, with or without MLD, is an effective intervention in reducing the volume of arm lymphedema. The findings suggest that CB alone should be considered as a primary treatment option in reducing arm lymphedema volume.
EZZO J, *et al.* (2015). [18]	Manual lymphatic drainage for lymphedema a after breast cancer treatment.	Evaluate the efficacy and safety of lymphatic drainage in the treatment of lymphedema.	The findings were contradictory for function (range of motion) and inconclusive for quality of life. For symptoms such as pain and weight, 60% to 80% of participants reported feeling better regardless of the treatment they received. A year of follow-up suggests that once the swelling has been reduced, participants are likely to keep their swelling low if they continue to wear a custom sleeve.
DE VRIEZE, *et al.* (2017). [19]	Protocol of a randomized controlled trial on the efficacy of fluoroscopy-guided manual lymphatic drainage for the treatment of breast cancer-related lymphoedema	The aim of the present study is to determine the efficacy of fluoroscopy-guided MLD, in addition to other parts of decongestive lymphatic therapy and compared to traditional MLD or placebo in the treatment oflymphedema.	All subjects receive 3 weeks of daily intensive treatments and 6 months of maintenance treatment. The follow-up period is 6 months. The primary results are the reduction of lymphedema volume of the arm/hand and the change in the stagnation of lymphatic fluid at the shoulder/trunk level.
UZKESER, *et al.* (2013). [20]	Lymphatic drainage and intermittent use of pneumatic compression pump in the treatment of lymphedema after mastectomy: a randomized controlled trial Effectiveness of manual	This study has two objectives. The first was to investigate the efficacy and contribution of an intermittent pneumatic compression pump in lymphedema management, and the second was to evaluate the correlation of our measurement methods.	It was concluded that the pneumatic compression pump did not contribute to the reduction of lymphedema. In addition, measuring dermal thickness using USG can be a useful measurement method in lymphedema assessment.
BAHTIYARCA, *et al*. (2018). [21]	The addition of auto lymphatic drainage to compression therapy instead of manual lymphatic drainage in the first phase of complex decongestive therapy for the treatment of breast cancer-related lymphedema: a prospective randomized controlled trial	The aim of this study was to investigate the effects of the addition of autolymphatic drainage (SLD) to compression banding (CB) therapy instead of manual lymphatic drainage (MLD) in the first phase of complex dysglastic therapy (CDT) on arm edema, quality of life, upper extremity function and anxiety-depression in patients with breast lymphedema (BCRL).	Our study results suggest that compression therapy with or without SLD is effective in the treatment of BCRL. However, adding SLD to CB in the first phase of CDT instead of MLD seems to provide no additional significant benefit.

Source: Author database (2021).

4. Discussion

Indicating the discussion of the results obtained throughout the research, it is possible to argue that the intervention of the physiotherapist is something primordial with regard to the treatment of lymphemdemas, through appropriate techniques, such as manual lymphatic drainage. The field of action of physiotherapy has its relationship with the paths, through the lymphatic vessels, so that it can promote resorption, as well as the conduction of the accumulation of fluid in the area with edema with regard to acting on normal areas, so that it can encourage the development of the collateral drainage pathways, in order to be able to control the long-term expansion [23].

For Sousa and Basqueroto (2015)[24], manual lymphatic drainage (MDL) has the function of evacuating the excessive accumulation of interstitial fluid through the lymphatic system. In this context, also emphasizing that drainage is a massage technique with slow movements, gentle and with constant rhythm in the skin, following the anatomical paths of the lymphatic system, with the objective of draining excess fluid in the interstitium, in the tissue and inside the vessels, through the anastomoses, improving the motricity of the capillaries and dissolving lymphostatic fibrosis.

The intervention of the physiotherapist becomes indispensable for the treatment of lymphemdemas, through appropriate techniques, such as manual lymphatic drainage. Physiotherapy acts on the pathways of the lymphatic vessels, promoting the resorption and conduction of fluid accumulation from the area with edema to normal areas, and encouraging the development of the drainage collateral pathways in order to control long-term expansion. [17]

According to Monteiro e Almeida (2020)[13], lymphedema is defined by the accumulation of proteins in the interstice, edema and chronic inflammation that results in the ineffectiveness of lymph transport thus characterizing its clinical manifestation. The advancement of lymphedema leads to a chronic, progressive pathological condition, caused by damage to the lymphatic system.

Manual lymphatic drainage is among the main techniques used by physiotherapy for lymphedema treatment. Its goal is to optimize lymphatic circulation, eliminate waste and decrease blood. It is characterized by a massage, performed with gentle, slow and intermittent pressures from distal to proximal region, always done according to the path of the lymphatic system.[13]

A randomized controlled trial was conducted in 58 women with lymphedema after mastectomy. The control group included 29

patients who received standard care such as: skin care, exercises and compression measures, bandages for 1 month, and then compression clothing. The experimental group included 29 patients with combined standard manual lymphatic drainage treatment. Treatment was performed every day for 4 weeks, and the condition was evaluated 1, 3 and 6 months after treatment[14].

They obtained as a primary result the reduction of the volume of the affected arm soon after treatment. Secondary parameters included: duration of lymphedema reduction and improvement of symptoms (feeling of swelling, degree of pain and functional limitation, difficulty looking in the mirror, which results in dissatisfaction with body image)[14].

For these facts, it is argued by Prado (2020)[25] where he agrees that the multidisciplinary approach was becoming something indispensable for the evolutionary process corresponding to the treatment of breast cancer, considering not only what is referred to the issue of pathological condition, but also with regard to physical, psychological and professional rehabilitation, besides having a real concern about the improvement of the quality of life after treatment.

Also, according to the author, most mastectomized women are only directed to physiotherapy sessions when they already develop some complication, whether functional damage or aesthetic damage, which reduces the chances of a complete physical-functional recovery, causing anxiety, depression, among others[25].

McNEELY, *et al* (2004)[17] evaluated 50 women with lymphedema, with a mean age of 59 years, four weeks of combined lymphatic drainage or not compression bandage were randomly assigned. At the end of the study, it was evidenced the reduction of lymphedema volume of the arm, which was verified by the volumetry of water displacement and circumference measurement. Arm volume with lymphedema decreased significantly after 4 weeks regardless of treatment. Women with mild lymphedema who received both techniques presented a higher percentage reduction in volume compared to patients with mild lymphedema who received only the compression bandage[17].

EZZO J, *et al*. (2015). [18] evaluated the results of six clinical trials, where they evaluated the contribution of manual lymphatic drainage in the treatment of lymphedema in breast cancer. 60% to 80% of participants reported feeling better regardless of the treatment they received. The authors also emphasize the lack of interest of some professionals in researching the impact of the physical and the psychosocial difficulties of these patients on their quality of life. In conclusion, the need to perform well-designed and randomized trials of physical treatments and their impact on health is a priority.

DE VRIEZE, *et al.* (2017). [19] conducted a randomized clinical trial in university hospitals in Belgium. About 201 participants with chronic lymphedema in stage 1 or 2 of the arm or hand participated in the study, with at least 5% difference between both sides. All participants received standard treatment that is composed of skin care, exercise and compression therapy. The control group received traditional manual lymphatic drainage and a second group received a placebo from manual lymphatic drainage. All women received daily intensive treatments for 3 weeks and another 6 months of maintenance in the treatment. The primary results obtained are linked to the reduction of lymphedema volume in the arm and hand region with the change of stagnation in lymphatic fluid at shoulder/trunk level.

A similar study was also done by UZKESER, *et al.* (2013).[20] with the sample of 31 patients. The women were randomly divided and divided into two groups by consecutive allocation according to the time of admission. Group 1 consisted of 15 women receiving treatment including skin care, compression bandage, manual lymphatic drainage, compression clothing, and exercise. Group 2 was composed of 16 women, where they received pneumatic compression. Pneumatic compression was applied after manual lymphatic drainage with a pressure of 40 mmHg for 45 minutes. All groups were treated five times a week for 3 weeks (a total of 15 sessions). Improvements were observed in both groups after treatment.

Still UZKESER, *et al.* (2013). [20] says manual lymphatic drainage is an effective and safe treatment that acts in reducing lymphedema. Improvements have been observed due to the effects of this technique in both study groups. The results obtained show that pneumatic compression pumps do not have an additional effect in reducing lymphedema.

BAHTIYARCA, *et al*. (2018). [21] conducted a study with 24 patients with a mean age of 42 to 83 years after mastectomy, and they were randomly assigned to receive the compression bandage associated or not with manual lymphatic drainage. Limb edema was evaluated and volume was calculated based on the circumference of the limb. The SF-36 questionnaire was used as an evaluation method, which assesses quality of life and hospital anxiety and depression scale (HADS). Patients were evaluated before treatment at the end of treatment and six months after treatment.

A very significant decrease in the volume in the affected arm was observed in both research groups at the end of treatment. Improvements in SF-36 scores were also observed in both groups, however, there was no change in anxiety and depression scores[21].

The results of the study by MELAM *et al*. (2016) [16] showed that individuals from both groups showed improvement in pain (VAS) and QOL, when evaluated by QLQ-C 30 and QLQ-BR 23. Comparing the efficacy of treatment strategies that was the use of body lymphatic drainage for patients with post-mastectomy lymphedema, group I showed better quality of life and significant pain reduction. During the first 4 weeks of treatment, the degree of pain reduction increased and quality of life improved, but in the first two weeks the effect continued at a slower pace. In this study they found that lymphatic drainage and corrective exercises helped improve qoL.

A similar study by KIM *et al.* (2011) [22], investigated the effect of decongestant treatment on unilateral lymphedema and quality of life of post-mastectomy patients. The results showed that the reduction of lymphedema in the affected limb during the treatment period significantly improved qoL, which is related to the reduction of limb volume measured with the Korean version of SF-36 and the significant difference in physical function and quality of life related to the research.

The study of GURDAL *et al.* (2012) [15] were divided into 2 groups, each containing 15 patients, in total, 30 people participated in the research, they received treatment for lymphedema for 3 days within one week and every day for 6 weeks. Arm circumferences were measured before the first, third and sixth week of treatment. Two tests were also performed in order to evaluate the quality of life before and after 6 weeks of treatment, the tests were EORTC-QLQ and ASES both are questionnaires.

People from both groups presented similar clinical characteristics. No difference was found between the two groups in relation to the decrease in arm volume in both modalities. The ASES scores were significantly better in both groups without any difference. In relation to emotional functioning, fatigue and pain were improved in both groups, while overall status, functional and cognitive functioning scores were improved only in patients in group I [15].

5. Conclusions

With the research, it was possible to identify that the physiotherapeutic treatment is indispensable in the performance in women after surgery of mastectomy.

Several benefits of physiotherapy treatment were identified through the technique of manual lymphatic drainage, such as pain relief, lymph node clearance and conduction to a

less congested area, decreased edema, fluid reduction, in addition to its preventive action, avoiding lymphedema, fibrosis and hematomas, among others.

It is also important to highlight that the benefits arising from manual lymphatic drainage go beyond the clinical aspect, as they help improve the quality of life, the well-being of the woman and issues of acceptance of the body after the loss of an essentially female organ.

It was evidenced that manual lymphatic drainage presents even more potentiated results when associated with other physiotherapy techniques such as complex decongestive physiotherapy, intermittent pneumatic compression, compression clothing, the use of bandages, prescribed exercises, therapeutic laser treatment and lymph taping.

We consider that the literature found contributed to the construction of this review, however we reinforced the importance of further studies on the beneficial effects of manual lymphatic drainage in post-mastectomy women.

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