

## Manual Lymphatic Drainage in Mastectomized Women with Lymphedema: Scientific Production in Brazilian Literature

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### Abstract:

**Objective:** To identify Brazilian researches related to lymphatic drainage in mastectomized women with lymphoedema.

**Methods:** This is a descriptive – exploratory study, based on a literature review conducted from 1997 to 2010. Publications related to manual lymphatic drainage in mastectomized women in Brazil were researched in the MEDLINE, SCIELO and LILACS databases using subject descriptors like Brazil, breast cancer, mastectomy, lymphoedema, lymphatic drainage. **Results:** From the 750 selected articles, eight were relevant to the research objectives, however, only three referred, exclusively, to manual lymphatic drainage in mastectomized women. **Conclusion:** Despite the benefits of manual lymphatic drainage, the number of publications was low, indicating little scientific divulgation about the subject. This fact requires further incentive for research and publication on physiotherapy performance in mastectomized patients with lymphoedema.

**Keywords:** Breast cancer; Mastectomy; Lymphoedema; Drainage; Physiotherapy.

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### 1. INTRODUCTION

Cancer is a leading cause of death and its incidence continues to rise, as each year 12.7 million people are diagnosed with the disease. It is estimated that of all new cases in 2012, breast cancer among women represents 23% worldwide and 29% in the United States of America [1]. Notwithstanding, the Brazilian National Cancer Institute (INCA) estimated, for the year 2012, that breast cancer is the second most common type in Brazilian women (27.9%), following the magnitude observed in Latin America [2].

Since early prevention has not been established as a routine in women's lives, a large proportion of breast cancers are diagnosed at an advanced stage and require surgical treatment which is usually a crippling treatment.

The study observed significant improvements concerning surgical treatment, from the classical mastectomy described by Halsted in 1894 [3], whose surgeries used methods to preserve the pectorales major muscle or both pectorales, techniques known as modified radical mastectomy [4].

The main complication of breast cancer surgery is lymphoedema in the ipsilateral upper limb which occurs when lymphatic demand is greater than the flow of lymph. When it is not treated, it

progressively increases, as well as its complications. The lymph present in the interstices, with a high concentration of proteins, produces fibrosis, promotes accumulation of bacteria and causes cellulites, obesity, seroma, positive lymph nodes, delayed wound healing, enlarged axillary dissection, immobilization of the arm in the post-surgery, among other problems. In this context, the lymphatic system works to remove liquids and proteins of the interstitial spaces, especially through the vascular system (capillaries, collectors, trunks and ducts) and the complex lymphomieloid which are its main access ways so that the liquid can flow from the interstitial spaces into the blood [5].

Studies have shown that psychosocial problems are more severe in mastectomized women with lymphedema [4]. There is a strong correlation between the severity of edema and the fear of performing movements [6], and besides the physical and emotional discomfort, depression and anxiety are also detected [7]. Decreased distensibility capacity of the subcutaneous tissue of the structures involved (shoulder, elbow, wrist and hand of the affected side) is also a complication of lymphoedema after breast cancer treatment, damaging movements and causing a reduced amplitude [8].

For women, having cancer implies family and personal reorganization in social, psychological, emotional and spiritual aspects [9] and requires psychological or psychiatric follow-up. Thus, it is important that health professionals seek scientific and interdisciplinary knowledge [7].

Different countries, including Brazil, have considered the Manual Lymphatic Drainage (MLD) alone or combined with other techniques, an ally in the prevention and treatment of post mastectomy lymphedema [6, 8, 10-14].

The MLD technique, reported as preventive or complementary to other treatments due to its performance in the general functions of the lymphatic circulatory system and the process in its maneuvers, requires adequate knowledge of the anatomy and physiology of the lymphatic system and technique employed [14]. However, researchers [15] suggest that scarcity in literature on this subject hinders the exchange of theoretical referential about the technical and scientific knowledge for performing the technique. Indeed, it is important to know, through research and scientific literature, programmatic actions of DML developed for promotion and prevention that can be applied to improve the health status of patients, contributing to their quality of life and well-being. There are few studies about lymphatic drainage after mastectomy in Brazil, and physiotherapeutic treatment is not widely prescribed in our country. Then it is important to know what is known about physiotherapy treatment for lymphedema in Brazil.

The aim of this study is to present a literature review of Brazilian researches related to lymphatic drainage in mastectomized patients with lymphoedema in the period from 1997 to 2010.

## **2. MATERIAL AND METHODS**

This is an exploratory and descriptive study based on literature review of Brazilian publications related to MLD in mastectomized women. This study was conducted from March to June 2011. We searched the MEDLINE (International Literature on Health Sciences), SciELO (Scientific Electronic Library Online) and LILACS (Latin American and Caribbean Health Sciences) for articles published from 1997 to 2010, using the following key words: “lymphatic drainage”, “lymphedema”, “mastectomy”, “physiotherapy”, “breast cancer”, “Brazil”. It was considered the intersection of the keywords in order to obtain articles about the focus subject and could be available in Portuguese, Spanish or English. When there was duplication of authors founds across data bases we have considered only one work. We have found papers with different study designs, and included in the analysis all studies regarding lymphatic drainage in mastectomized women, that were published in peer-reviewed journals.

For the review, authors developed systematic methods, supported in the planning stages: a) identification of the need for revision; b) identification of literature by subject descriptors; c) organization and selection of studies found by refinement; d) quality assessment of studies regarding the subject proposed; e) data synthesis; and, f) completion of the evidences for clinical practice while promoting better quality of life for this population.

At first, all articles were categorized according to the database they were found in and ordered according to publishing dates. This organization criterion aimed to facilitate the analysis of the

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material. The process described complemented the preparation of frames used to describe the synthesis of data and quantify the information.

After selection and collection of material, all texts underwent exploratory, analytical and interpretative reading and were judged on their content, concerning whether they corresponded to the aim of this research or not. It was determined an importance ranking of databases: MEDLINE, SciELO and LILACS, avoiding repetition of articles, obtaining a final sample for a deeper analysis.

### 3. RESULTS

A total of 821 articles by Brazilian researchers were selected, of which eight were related to the use of lymphatic drainage in mastectomized women, however, only three referred directly to lymphatic drainage in mastectomized women with lymphoedema.

Table 1 shows the Brazilian publications on breast cancer, mastectomized women, lymphoedema and lymphatic drainage.

Chart I describes the characteristics of Brazilian publications identified for the study and proposed period according to author, date, source of the publication and title of work.

Chart II lists the publications directly related to MLD in mastectomized women with lymphoedema.

**Chart I.** Brazilian articles published on lymphatic drainage in mastectomized women. Brazil, 1997-2010.

Author/date/Periodical	Article	Objective	Methodological design	Results
Urban et al. Rev Col Bras Cir 2001; 28(3): 216-22 - Portuguese	Sentinel lymph node: a new concept in the surgical treatment of breast cancer.	Establish the fundamental theoretical basis for the implementation of the method and review the results of the major literature series.	Comprehensive literature review, involving the surgical aspects, Nuclear Medicine and Pathology of the sentinel lymph node.	Many studies have demonstrated the efficacy of sentinel node in predicting the axillary lymph nodes. However, there is still no consensus regarding the most appropriate and reproducible method.
Xavier et al. Rev Bras Ginecol Obstet. 2005; 27(6): 340-6- Portuguese	Comparison of lymphoscintigraphy with dextran 500 with the phytate in sentinel lymph node biopsy in breast cancer.	To blindly compare 99mTc dextran 500 and 99mTc phytate in the scintigraphic detection of sentinel lymph nodes.	46 patients with histological diagnosis of early breast cancer, without previous surgical treatment, were enrolled in our study. Each patient underwent lymphoscintigraphy twice: on one day with 99mTc dextran 500 and on another day with 99mTc phytate.	88 lymphoscintigraphic studies were performed in 44 patients. On the first image (taken at 1h), 34 patients from the 99mTc dextran group showed sentinel nodes compared with 28 positive examinations using 99mTc phytate (P = 0.113). On the second image (taken at 2h) 39 patients from the 99mTc dextran group showed positive results compared to 30 positive examinations using 99mTc phytate (P = 0.036). There was no statistically significant correlation between the body mass index or age and the result of the lymphoscintigraphy.
Meirelles et al. Rev Bras fisioter São Carlos 2006; 10 (4): 393-9 Portuguese	Evaluation of physical therapy techniques in the treatment of lymphoedema after breast surgery for women.	Check effectiveness of treatment of lymphoedema after breast cancer surgery and reducing the volume of the arm within 6,12,18 and 24 months after the intensive phase of treatment.	Cohort study. 36 women from 32 to 80 years, were assessed at 6,12,18 and 24 months in a specialized rehabilitation of women with breast cancer. Used manual lymphatic drainage, compression bandaging functional guidelines for self-care, self-massage, using elastic sleeve and exercises, over a period of up to two years. Had inclusion criteria: submission of breast surgery, having axillary unilateral perimetry to submit three or more cms of difference between measurements of arms and completed the intensive	There was a reduction of lymphoedema keeping over the period studied. The results of lymphoedema treatment with physical therapy techniques have prove to be as better and faster than other non-invasive methods for the treatment of lymphoedema.

			phase of treatment.	
Tiezzi et al. Rev Bras Ginecol Obstet 2006; 28 (1): 50-3 - Portuguese	Sentinel lymph node in breast cancer accessory: a case report.	Report cases found and revise whenever possible, lymphatic drainage related to breast cancer.	Case report of a patient with ectopic breast cancer in the left axilla and the identification of the sentinel lymph node technique by patent blue.	Discuss the studies related to the lymphatic drainage of ectopic breast tissue and the identification of the sentinel lymph node in this rare situation.
Bergmann et al. Braz arch biol technol 2008; 51 (special): 83-9 - English	Lymphoscintigraphy in Breast Cancer: A Short Review about the Impact on Upper Limb after Surgical Treatment.	The aim of this work is to present the main aspects which cause controversy about the sentinel lymph node (SLN) technique and the impact that these procedures have had on lymphedema after surgical treatment for breast cancer.	A short review including papers in English, Spanish and Portuguese, available on Lilacs and Medline database, published between January, 2000 and July, 2008 was performed. The key words breast cancer, lymphoscintigraphy, SLN biopsy, lymphedema were used.	The development of surgical techniques has permitted to minimize deformities and the current trend is that these techniques be as conservative as possible. Thus, lymphoscintigraphy plays an important role in the identification of SLN, contributing to the prevention and minimization of postoperative complications.
Abreu et al. Braz arch biol technol 2008; 51 (special): 57-61 - English	Sentinel lymph node detection through radioguided surgery in patients with breast cancer.	The aim of this study was, to verify the sentinel lymph node (SLN) localization in breast cancer through preoperative lymphoscintigraphy and intraoperative gamma-probe, as well as to demonstrate the benefits of such techniques in preventing complications of axillary lymphadenectomy (AL).	Medical records of 228 patients with breast carcinoma, who were underwent SLN localization and, radioguided surgery, from March 2005 to December 2007 were analyzed retrospectively. Data regarding age, tumor characteristic, breast involved, type of surgery, radiopharmaceutical drainage pattern, axillary assessment (SLNB or AL) and number of lymph nodes dissected were collected.	It was ascertained that radioguided surgery is a selective method of axillary assessment in breast cancer, which makes this technique a safe alternative to radical assessment of total dissection of axillary lymph nodes and its subsequent complications.
Oliveira e Cesar. Rev bras fisioter 2008; 12(1): 31-6 - Portuguese	Influence of complex decongestive physiotherapy associated with ingestion of medium-chain triglycerides in the treatment of lymphoedema of the upper limb.	To investigate the influence of complex decongestive therapy (CDT) in association with diet therapy using medium-chain triglycerides (MCT), as an intervention in cases of upper-limb lymphedema.	The lymphedema was evaluated by measuring circumferences, volumes, skin folds and whole-body water content. Feelings of discomfort, pain and heaviness in the arms were evaluated using a visual analog scale. Ten women who had undergone mastectomy and presented upper-limb lymphedema homolateral to the surgery participated in this study.	Analysis of the circumference and volume measurements showed significant differences between the groups, with a greater reduction in lymphedema in the MCT Group. There were no significant differences in the skin fold measurements or whole-body water content. The feeling of heaviness in the arms after the intervention was significantly less in the MCT Group, compared with before the intervention.
Leal et al. Rer Latino-am Enferm 2009; 17(5) - Portuguese	Physical therapy for lymphedema a after breast cancer: a literature review.	This systematic literature review aims to present physiotherapy modalities applied for lymphedema therapy.	The literature review was conducted using textbooks and Lilacs, Pubmed and SciELO databases, from 1951 to 2009. Physiotherapy resources used for lymphedema treatment include complex decongestive therapy (CDT), pneumatic compression (PC), high voltage electrical stimulation (HVES) and laser therapy.	The analyzed literature shows that better results are obtained with combined techniques. CDT is the most used protocol, and its association with PC has demonstrated efficacy. The new techniques HVES and laser present satisfactory results.

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**Chart II.** *Scientific production in Brazilian literature on manual lymphatic drainage in mastectomized women with lymphoedema. Brazil, 1997-2010.*

Author/date/Periodical	Title	Objective	Methodological design	Results
Meirelles et al, Rev Bras Fisiot 2006; 10 (4): 393-92006	Evaluation of physical therapy techniques in the treatment of lymphedema in women after breast surgery	Check effectiveness of treatment of lymphoedema after breast cancer surgery and reducing the volume of the arm within 6,12,18 and 24 months after the intensive phase of treatment.	Cohort study. 36 women from 32 to 80 years, were assessed at 6,12,18 and 24 months in a specialized rehabilitation of women with breast cancer. Used manual lymphatic drainage, compression bandaging functional guidelines for self-care, self-massage, using elastic sleeve and exercises, over a period of up to two years. Had inclusion criteria: submission of breast surgery, having axillary unilateral perimetry to submit three or more cms of difference between measurements of arms and completed the intensive phase of treatment.	There was a reduction of lymphedema keeping over the period studied. The results of lymphedema treatment with physical therapy techniques have prove to be as better and faster than other non-invasive methods for the treatment of lymphedema.
Oliveira e Cesar, Rev bras fisioter 2008; 12(1): 31-6	Influence of complex decongestive physiotherapy associated with ingestion of medium-chain triglycerides in the treatment of lymphedema of the upper limb.	To investigate the influence of complex decongestive physiotherapy - TCD (classic massage, lymphatic drainage and compressive bandage) associated with ingestion of medium-chain triglycerides (MCT) as an intervention in upper limb lymphedema..	Blind randomized study. We evaluated 10 women, mean age 65.9 years, body mass index (BMI) 26.8 with lymphedema of the upper limb ipsilateral breast cancer surgery and axillary lymphoedenectomy. Elected: group-control subjected to physical therapy for lymphedema, three times a week for four weeks; TCM Group underwent physical therapy three times a week and daily dietary intake of oil with medium chain triglycerides (MCT) the same period. For assessment of lymphedema was used cirtometry, volumes, skin folds and amount of total body water.	At the end of the intervention, the analysis of the circumference and volume showed significant differences between the groups, with a greater reduction in the lymphedema in TCM Group. There was no significant difference in the values of skin fold thickness and the amount of total body water. A feeling of heaviness in the arms before and after the invention was significantly lower in the MCT Group.
Leal et al. Rer Latino-am Enferm 2009; 17(5)	Physical therapy for lymphedema after breast cancer: a literature review.	To present and discuss the results of studies investigating the effectiveness of different physiotherapy modalities used in the treatment of this pathology.	A systematic review of the literature. Were searched LILACS, SciELO and PubMed in the period from 1951 to 2009 on physical therapy used in the treatment of lymphedema, including complex decongestive therapy (CDT), pneumatic compression (CP), electrical stimulation Hith voltage (EVA) and laser therapy.	The analyzed show that the results are better with combined techniques. CDT is the most wildly used protocol, and its association with the CP proves to be effective. The new EVA techniques and laser show satisfactory results.

### 4. DISCUSSION

Among the publications found, there was a large number of articles related to breast cancer, mainly in ScieELO database. This fact is explained by the high prevalence of this disease as it is reported by others [1, 2], being the second most common type of cancer among women. Considering this issue the Brazilian National Cancer Institute (INCA), in its publications, focus on the need for investments on comprehensive actions to control cancer at different levels of expertise: health promotion, early detection, patient care, surveillance, training of human resources, communication and social mobilization, research and management of the Brazilian National Health System.

Concerning the descriptor mastectomy, the number of researches decreased by 75% in relation to breast cancer. Only 55 scientific articles about breast surgery in women with breast cancer are nonetheless troubling, since they provide information and promote the production of knowledge through scientific research. The same was found in researches addressing issues related to lymphoedema.

Of the eight papers about lymphatic drainage, five [16-20] show exclusive studies on sentinel lymph nodes and detection of nodes through the lymphoscintigraphy technique and only three [8, 21, 22]

refer to MLD in mastectomized women with lymphoedema. Briefly, these authors describe the application of physiotherapy technique using manual lymphatic drainage for the treatment of lymphoedema as a powerful tool to reduce the edema, obtaining better results with combined techniques. They also report the need for greater commitment to epidemiological, interventional and health promotion research on the treatment of lymphoedema using the MLD.

Ferreira, Pimentel et al. [23] detected a high incidence of lymphoedema in the studied groups, and consider that the prognosis of breast cancer among the Brazilian women is aggravated by the fact that most of the diagnoses are made in advanced tumor stages, making it necessary to institute radical treatments, with a significant increase in mortality and poorer quality of life.

It is known that post mastectomy lymphoedema causes functional impairment and aesthetic damage to the affected limb and women often feel distressed, worried about appearance, and with a low self-esteem, affecting interpersonal and sexual relations [7].

Regarding the findings of Brazilian authors, the benefits of MLD are highlighted by Meirelles, Mamede et al. [8] for whom the treatment of lymphoedema with physiotherapeutic procedures proved to be better and faster than other noninvasive methods, and it is also supported by for it more effective observation of the cirtometry and volumetry [21], and by for achieving better results by combining techniques [22].

In this context, physiotherapeutic protocols for the treatment of lymphoedema include MLD, functional compressive bandaging, exercises, guidelines for self-care and self-massage and use of bandage, and it must comprehend an intensive phase, reducing lymphoedema mainly in the first week of treatment, and a maintenance phase [24]. These protocols are corroborated by Leduc, Leduc [14] when they showed that the lymphatic system achieves higher levels of absorption when bandaged patients underwent muscular activities. These authors emphasize that the compression bandages should be normally used after the end of treatment indefinitely to avoid recurrence of edema.

The physiotherapeutic rehabilitation of mastectomized patients has as its main goal the prevention of lymphoedema and other complications that may limit movements of the ipsilateral upper limb [25]. Following the guidance received by the doctor and the physiotherapist's evaluation, the treatment program must generate results, so that the accumulation of lymphatic fluid in the arms and hands is reduced, although this may occur gradually.

The knowledge over three factors are important issues for the therapeutic benefit in the postoperative period [14]: 1) Lymphatic system of the upper limb, 2) Lymphoedema - edema resulting from the imbalance between the supply of liquid and its drainage, 3) Lymphatic Drainage – maintenance of water balance of the interstitial spaces.

A previous study found that 40% of women undergoing radical mastectomy had lymphoedema, while this rate was 22.2% for the ones who underwent conservative surgery. Regarding physiotherapeutic rehabilitation, there was statistical significance between early and late rehabilitation, proving the prevention of complications though early intervention by the physiotherapist [26].

This research showed that there are few publications by Brazilian researchers and that they were not enough for the issue proposed. However, international studies corroborate and support the need for effective incentive for researchers on the issue in the sense that researches shall be conducted and published for the benefit of scientific knowledge. They also emphasize the positive effect of lymphatic drainage in the treatment of post-mastectomy lymphoedema, showing greater reduction of the edema, and suggest the compressive bandages as complimentary procedures, and they also report the great need for research on the issue [27].

It was observed significant improvement of lymphoedema ( $p < 0.05$ ) in the group of women who underwent treatment with complex decongestive physiotherapy (lymphatic drainage, layers of compression bandage, elevation, exercise for recovery and skin care) [28]. Findings confirm that MLD can provide a statistically significant reduction ( $p < 0.001$ ) in the volume of lymph and improvement in the arm when combined with layers of compression bandage [29].

In the UK, a research found benefits of MLD in women with post mastectomy lymphoedema in a series of measures, such as reduction of edema, dyspnea, sleep disturbance, pain, heaviness, consequently, in what concerns the quality of life ([13]. Moreover, it was detected in ten controlled

randomized trials on post-mastectomy lymphoedema the evidence that compressive therapy and MLD stabilize lymphoedema, although they advocate that there is no need for confirmation studies [30].

In this context, the early physiotherapy for at least one year after surgery for breast cancer is an effective intervention in the prevention of secondary lymphoedema involving dissection of axillaries lymph nodes in women [31].

An audit in the “London Haven Lymphoedema Service” on the treatment of lymphoedema related to breast cancer reinforces that, within the key issues surrounding the practice, there is a need for research in areas of lymphoedema management [32].

It is important to inform the patient that the manual lymphatic drainage applied after axillaries dissection for breast cancer, even with guidelines and exercise therapy is unlikely to have much effect, in a short term, on the prevention of lymphoedema in the arm [33]. This finding corroborates the need for research and supports the view that clinical trials are needed to determine which interventions can improve lymphoedema and its impact on quality of life of breast cancer survivors [34].

The scarcity of scientific publications on post mastectomy lymphatic drainage in Brazilian literature [8,21,22] needs to be overcome by researches from various countries in which the authors demonstrate the effectiveness of the protocol in manual lymphatic drainage to reduce swelling, pain and other complications and also emphasize the need for detailed studies on the topic.

## **5. CONCLUSION**

Despite the proven benefits of manual lymphatic drainage in mastectomized women with lymphedema, the number of Brazilian scientific publications is scarce and indicates little disclosure on the subject. Knowing that literature provides knowledge for health professionals and subsidies public policy development in the health system, there is a need for support and promotion of research and publications on the physiotherapeutic performances related to mastectomized patients with lymphedema.

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