9. Asensio Castaneda E., Navarro R.M., Chamorro J.L., Ospina-Betancurt J. (2023). A Holistic Vision of the Academic and Sports Development of Elite Spanish Track and Field Athletes. *International journal of environmental research and public health*, *20*(6), 5153. DOI: https://doi.org/10.3390/ijerph20065153

10. Amantova I., Abele A. (2020). Dual career model for Latvia's environment. In *SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference* (Vol. 6, pp. 28-38).

11. López de Subijana C., Barriopedro M., Conde E. (2015). Supporting dual career in Spain: elite athletes' barriers to study. *Psychology of sport and exercise, 21, 57–64.* DOI: https://doi.org/10.1016/j.psychsport.2015.04.012

12. Gomez J., Bradley J., Conway P. (2018). The challenges of a high-performance student athlete. *Irish Educational Studies, 37:3, 329-349.* DOI: 10.1080/03323315.2018.1484299

DOI: https://doi.org/10.31392/UDU-nc.series15.2024.3K(176).06

Kuzmenko Oleksandr,
https://orcid.org/0000-0002-2711-3027
PhD in Biology
Associate Professor of the Department of Health Care education and physical recreation
Mykhailo Dragomanov state university of Ukraine
Ignatenko Serhii,
https://orcid.org/0000-0001-7717-0444
PhD in Pedagogy
Associate Professor of the Department of Health Care education and physical recreation
Mykhailo Dragomanov state university of Ukraine
Kostryba Oleksiy,
Department of breast tumors and its reconstructive surgery
National Cancer Institute

LYMPH DRAINAGE MASSAGE AS ONE OF THE MEASURES FOR CORRECTION OF LYMPH FLOW DISORDERS AFTER MASTECTOMY IN WOMEN WITH BREAST CANCER

Objective: *Current physical rehabilitation programs for women after mastectomy related to breast cancer.* ***Methods:*** *theoretical analysis and generalization of scientific and methodical literature data on complications after mastectomy in the form of formation lymphedema and physical rehabilitation. Such means and procedures include self-massage, manual lymphatic drainage massage, physical therapy, compression bandaging, wearing elastic compression underwear, Kinesio Tex taping, pneumatic compression, ultrasound and electrostatic therapy, extracorporeal shock wave therapy and others.* ***Results:*** *existing physical rehabilitation programs include the use of therapeutic gymnastics, manual lymphatic drainage, physical therapy, and therapeutic massage aimed at preventing postoperative complications and countering pathological changes in the lymphatic system in the postoperative period.* ***Conclusions:*** *the analysis of scientific sources proved that after mastectomy, the main method of prevention and treatment of such a complication as lymphedema is the use of complex anti-congestion therapy based on manual lymphatic drainage, compression therapy, lymphatic drainage exercises and skin care.*

Key words: *physical rehabilitation, manual lymphatic drainage massage, mastectomy, lymphedema, breast cancer.*

Кузьменко О.П., Ігнатенко С.А., Костриба О.І. Лімфодренажний масаж як один із засобів корекції порушення лімфотоку після мастектомії у жінок з раком грудної залози. Мета: *сучасні програми фізичної реабілітації жінок після мастектомії, пов'язаної з раком грудної залози.* ***Методи:*** *Методи: теоретичний аналіз та узагальнення даних наукової та методичної літератури з питань складнень після мастектомії у вигляді утворення лімфедеми та засобів фізичної реабілітації. До таких засобів і процедур відносяться самомасаж, ручний лімфодренажний масаж, лікувальна фізкультура, компресійне бинтування, носіння еластичної компресійної білизни, тейпування Kinesio Tex, пневматична компресія, ультразвукова та електростатична терапія, екстракорпоральна ударно-хвильова терапія та інші.* ***Результати:*** *наявні програми фізичної реабілітації передбачають застосування лікувальної гімнастики, мануального лімфодренажу, фізіотерапії, лікувального масажу, спрямованих на запобігання післяопераційним ускладненням та протидію патологічним змінам в лімфатичній системі в післяопераційний період.* ***Висновки:*** *аналіз наукових джерел засвідчив, що після мастектомії основним методом профілактики та лікування такого ускладнення як лімфедема є застосування комплексної протизастійної терапії на основі мануального лімфодренажу, компресійної терапії, лімфодренажних вправ та догляду за шкірою.*

Ключові слова: *фізична реабілітація, мануальній лімфодренажний масаж, мастектомія, лімфедема, рак грудної залози.*

In 2020, breast cancer was diagnosed in 2.3 million women and caused 685,000 deaths worldwide. As of the end of 2020, 7.8 million women who were diagnosed with breast cancer in the last 5 years were alive, making this type of cancer the most common cancer in the world. Breast cancer occurs in all countries of the world in women of any age after reaching puberty, and the

incidence rates increase with age. One of the most characteristic features of the spread of malignant tumors among the female population of economically developed countries is a significant increase in the frequency of breast cancer, which occupies a leading place in the structure of oncological morbidity and mortality. In the structure of cancer morbidity among women in Ukraine, breast cancer also ranks first. There are more than 150,000 breast cancer patients registered in oncological institutions of Ukraine. About 17,000 new cases of breast cancer are registered annually. Despite the fact that malignant neoplasms of the breast belong to visual localizations, according to the National Cancer Registry of Ukraine, neglected cases of breast cancer in 2020 make up 20.5%, and in some regions this indicator reaches more than 30% [1].

One of the methods of treatment for this pathology is mastectomy, which is a surgical type of breast cancer treatment in which the mammary glands are completely removed. After mastectomy, specific anatomical and functional changes and disorders can occur, which can be prevented including through physical therapy.

Lymphedema is one of the most complex pathologies that develops most often after mastectomy. It arises as a result of a violation of the flow of lymph and a blockage in the lymphatic system on the operated side. The term "lymphedema" is used to denote pathological conditions in which there is an intense regional accumulation of fluid with a large amount of protein in the interstitium. Lymphedema can occur immediately or several months or even years after surgery. If multiple lymph nodes are removed during a mastectomy, there is an increased risk of developing lymphedema throughout life. This is a chronic condition that requires constant supervision, prevention and treatment. If adequate physical therapy is not started in a timely manner in the postoperative period, the risk of an inelastic, massive scar and a violation of the normal motor function of the shoulder with the formation of a contracture (decreased range of motion in the joint) increases. The causes of lymphedema, regardless of the amount of surgical intervention on the mammary glands, are surgical transection of lymphatic collectors and axillary lymphadenectomy, which leads to the formation of a cavity, the size of which affects the frequency of postoperative complications. Most often, these are seromas (lymphoceles), which are localized in the armpit and, a little less often, in the area of widely separated skin flaps. It is impossible to completely prevent the development of lymphorrhea after axillary lymph node dissection of several regional areas, crossing of a huge number of lymphatic vessels, extensive separation of skin flaps, but it is possible and necessary to prevent prolonged and abundant lymphorrhea, which exhausts the patient and leads to numerous complications. After surgical removal of lymph nodes, all the lymphatic fluid accumulates in the shoulder and forearm area. Lymphatic collectors undergo fibrous changes, fibrin thrombi are formed in them, and vessel obliteration occurs. Lymph nodes become hard and decrease in size. Unlike edema in venous hypertension (venous thrombosis, congestive heart failure), chronic lymphedema is not accompanied by lymphatic hypertension. Lymphostasis causes the accumulation of protein and cellular metabolites, such as macromolecular protein and hyaluronic acid, in the extracellular space. The concentration of protein in the interstitium reaches 1-5.5 g/ml, therefore, the colloid osmotic pressure in the tissue increases, which leads to the accumulation of water and an increase in hydraulic interstitial pressure. Lymphatic ducts that continue to function expand as a result of overload, insufficiency of their valves develops, reverse lymph flow from the subcutaneous tissue to the dermal plexuses. Chronic lymphostasis leads to an increase in the number of fibroblasts, adipocytes, and keratinocytes in the swollen tissue. The zone of chronic inflammatory reaction is often demarcated by mononuclear cells (mainly macrophages), resorbing elastic fibers and contribute to tissue sclerosis. In most patients, there is an increase in collagen deposits in the swollen skin and subcutaneous tissue, increased growth of fat and connective tissue. Histological examination reveals thickening of the basement membrane of lymphatic vessels, fragmentation and degeneration of elastic fibers, an increase in the number of fibroblasts, inflammatory cells, and pathological collagen fibers. Ultimately, this process leads to progressive subcutaneous fibrosis [5]. This distinguishes lymphedema from other types of edema, in which the concentration of protein in the tissues is much lower. If the swelling has passed 1-2 months after mastectomy, then this is post-mastectomy lymphostasis. The danger of post-mastectomy lymphostasis of the upper limb is that swelling can cause its deformation and is often accompanied by serious inflammatory reactions.

Post-mastectomy lymphostasis causes a lot of discomfort to patients and can be the cause of stress and depression. Lymphedema limits the range of motion of the upper limb and the ability to self-care. The patient's quality of life and self-esteem decreases, severe depression may develop. To overcome this problem, complex therapy is usually prescribed: physiotherapy, drug treatment and physical therapy [3]. Regular classes help maintain physical activity at a sufficient level, improve the general state of health, improve sleep and the patient's ability to control pain. At the American Society of Clinical Oncology's 2018 symposium, the results of studies proving the effectiveness of postoperative physical therapy for breast cancer were presented. Patients who received physical therapy and information about how to improve mobility and reduce the severity of lymphedema recovered more quickly than women who did not receive physical therapy. [https://naiu.org.ua/fizychna-terapiya-pislya-mastektomyi/].

Complete anticongestive therapy is the most popular and gold standard for the treatment of lymphostasis and consists of two phases [4]. The first phase includes teaching the patient about careful skin care, manual lymphatic drainage, multi-layered non-elastic compression bandages and exercises. The second phase includes continued skin care and exercise in addition to self-massage and compression bandages. A special massage technique (manual lymphatic drainage) is aimed at strengthening the contractility of the lymphatic ducts and accelerating the indirect lymphatic outflow through the collateral lymphatic vessels of the skin. Manual lymphatic drainage is an easy but very specific treatment procedure designed to reduce lymphedema by increasing lymphatic drainage. Manual lymphatic drainage is sometimes used alone, but is often prescribed as part of a four-component conservative treatment known as comprehensive anti-congestion therapy. The four components of comprehensive anti-congestion therapy are manual lymphatic drainage, compression therapy, lymphatic drainage exercises, and skin care. Complex anti-congestive therapy is the most common method of treatment for many types of lymphedema. In the first stage, which lasts from two to four weeks, the goal is to reduce the swelling with the help of manual lymphatic drainage and a compression bandage [6]. The therapist also instructs the patient on skin care rules to keep the skin healthy and infection-free, and prescribes special lymphatic drainage exercises. Modifications of complex anti-congestion therapy may include replacing the compression bandage with a compression sleeve. At the second stage, after the extremity is sufficiently reduced in volume, compression underwear is put on the patient. The

goal of the second stage is to maintain the reduction in the volume of edema achieved in the first stage with the help of independent compression therapy, lymphatic drainage exercises and independent lymphatic drainage [7]. Manual lymphatic drainage is usually not prescribed at the second stage, if there is no need for it; however, many participants continue to maintain manual lymphatic drainage in addition to self-massage. Patients also continue skin care [8].

Of the entire complex of conservative therapy of lymphatic edema, pneumatic compression is the most effective and physiological. The therapeutic effect of this method is based on increasing the pressure in the tissues, which ensures increased venous outflow. When performing pneumatic compression, maximum pressure must be created in the peripheral parts of the limb. As a result of compression therapy, lymphatic and venous outflow improves. The term "compression therapy" is used to describe the compression part of lymphedema therapy, including bandages, sleeves, or specially selected garments. To prevent edema, a complex of rehabilitation measures is recommended, including the use of compression, photodynamic and metabolic therapy [2].

With the combined use of compression therapy and medical elastic bandages, photodynamic and metabolic therapy, as well as appropriate physical exercises, prevention is achieved and an effective reduction of lymphatic edema is observed. Many studies have shown that part of compression therapy, which usually starts with a compression bandage and then using a compression sleeve, can effectively reduce swelling [9] Complex anticongestive therapy is used in the medical literature as a synonym for complete anticongestive physiotherapy or anticongestive lymphatic therapy [9].

Manual lymphatic drainage should not be confused with other types of massage that affect the contraction of lymphatic vessels. The massage is carried out in three stages. The first stage is energetic rubbing and kneading of the muscles of the shoulder girdle and long muscles of the back, which is necessary to increase the tone of hypotrophied muscles and superficial vessels, and accelerate venous outflow. The second stage is light rubbing, stroking of the shoulder and areas of the shoulder joint in the proximal direction from the elbow, then the forearm and hand at a slow pace. The third stage is flat stroking of the entire limb from the fingers to the shoulder joint. Moderate tissue compression during manual lymphatic drainage improves initial lymphatic capillary filling and increases transport capacity by dilating skin lymphatic vessels and developing additional lymphatic collectors.

Therapeutic massage helps restore the micro- and macrocirculation of tissue fluid and leads to a reduction or complete elimination of swelling of the upper limb on the side of the operation. At all stages of the massage, deep kneading, beating and vibration are not allowed. After the massage, the skin of the limb should not be hyperemic, which is an indicator of the absence of a sharp increase in blood flow [2].

Contraindications for the use of manual lymphatic drainage are congestive heart failure, deep vein thrombosis, and acute infection.

References

1.Payenok O., Perederii A. (2017) Modern rehabilitation programs for women with breast cancer. Sports Science of Ukraine No. 1 (77). 43-50. (Ukrainian)

2.Fedorenko Z.P., Mykhailovych Yu.Y. (2021) Cancer in Ukraine, 2020–2021. Morbidity, mortality, performance indicators of the oncology service. Bul. National Chancery-Register of Ukraine, 33: 120. (Ukrainian)

3.Cho Y, Do J, Jung S, Kwon O, Jeon JY. (2016). Effects of a physical therapy program combined with manual lymphatic drainage on shoulder function, quality of life, lymphedema incidence, and pain in breast cancer patients with axillary web syndrome following axillary dissection. Support Care Cancer. May;24(5):2047-2057. doi: 10.1007/s00520-015-3005-1.

4.De Vrieze T, Gebruers N, Nevelsteen I, Fieuws S, Thomis S, De Groef A, Tjalma WA, Belgrado JP, Vandermeeren L, Monten C, Hanssens M, Devoogdt N. (2022) Manual lymphatic drainage with or without fluoroscopy guidance did not substantially improve the effect of decongestive lymphatic therapy in people with breast cancer-related lymphoedema (EFforT-BCRL trial): a multicentre randomised trial. Physiother.;68(2):110-122.doi:10.1016/j.jphys.2022.03.010.

5.Donahue PMC, MacKenzie A, Filipovic A, Koelmeyer L. (2023). Advances in the prevention and treatment of breast cancer-related lymphedema. Breast Cancer Res Treat. Jul; 200(1):1-14. doi: 10.1007/s10549-023-06947-7.

6.Kasseroller RG, Brenner E. (2023). Effectiveness of manual lymphatic drainage in intensive phase I therapy of breast cancer-related lymphedema-a retrospective analysis. Support Care Cancer. Dec 5;32(1):5. doi: 10.1007/s00520-023-08210-7.

7.Lovelace DL, McDaniel LR, Golden D. (2019). Long-Term Effects of Breast Cancer Surgery, Treatment, and Survivor Care. J Midwifery Womens Health. Nov; 64(6):713-724. doi: 10.1111/jmwh.13012.

8.Sen EI, Arman S, Zure M, Yavuz H, Sindel D, Oral A. (2021). Manual Lymphatic Drainage May Not Have an Additional Effect on the Intensive Phase of Breast Cancer-Related Lymphedema: A Randomized Controlled Trial. Lymphat Res Biol. Apr;19(2):141-150. doi: 10.1089/lrb.2020.0049.

9.Yan Lin , Yan Yang, Xiaoyu Zhang, Wandi Li, Haoran Li, Dali Mu (2022). Manual Lymphatic Drainage for Breast Cancer-related Lymphedema: A Systematic Review and Meta-analysis of Randomized Controlled Trials.
Clin. Breast. Cancer Jul; 22(5):e664-e673. doi: 10.1016/j.clbc.2022.01.013.