

# Effect of Complex Decongestive Therapy (CDT) and Manual Lymphatic Drainage (MLD) on Lymphedema Control After Surgery in Breast Cancer Patients -A Literature Review

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## ABSTRACT:

**Background:** Breast cancer considerably affects both developed and developing nations globally, it has been the focus of several studies. Lymphedema in breast cancer survivors is a more prevalent condition that healthcare providers often fail to completely comprehend. About five in one women who have undergone breast cancer surgery acquires Breast Cancer Related Lymphedema (BCRL). Lymphedema is a chronic and debilitating disease that that can develop as a consequence of breast cancer treatment. It can have disastrous impacts on a patient's quality of life associated with lymphedema. In general, it is underreported and undertreated. The aim of this reviews study is to determine the effectiveness of CDT on reducing the occurrence of lymphedema in breast cancer patients.

**Methodology:** For these studies literature review, databases PubMed, Google Scholar and science direct were employed. Articles published from 2019-2023, and with the full English text met the inclusion criteria. Articles published prior to 2019 and articles having an incorrect abstract were excluded.

**Results:** CDT has been shown to be useful in reducing the symptoms associated with BCRL. It proved that exercise is safe, in addition to it is important to continue exercise in daily life. The functional status of the patients also showed a noticeable improvement.

**Conclusion:** In patients with BCRL, CDT improves upper extremity functioning and quality of life. Contributing factors include the decrease in volume of lymphedema, aching and heaviness, and an increase in shoulder movement. CDT is a promising therapeutic modality for the lymphedema.

**Keywords:** Breast cancer, lymphedema, complex decongestive therapy, manual lymphatic drainage, quality of life.

## INTRODUCTION

Breast cancer is the most prevalent malignancy in women around the world<sup>1</sup>. Cancer cells can spread throughout the body through the lymphatic and blood systems, infect nearby healthy tissue, and generally wreak havoc. This process is known as metastasis<sup>2</sup>. More women are surviving breast cancer as a result

of increased early identification and advancements in therapies. Depending on the country's degree of development, the survival rate for breast cancer ranges from 40-80%. Survivors of breast cancer are more likely to suffer from persistently related to treatment sequelae such as breast cancer-related lymphedema (BCRL), the most prevalent type. A pathological condition known as BCRL is defined by a proliferation of lymphatic fluid rich in proteins in the extracellular spaces. Almost 40% of patients who underwent surgery for breast carcinoma may experience it as a result of lymphatic system defects.<sup>3</sup> BCRL can develop in the upper extremities ipsilateral upper quadrant, and residual breast tissue. Dissection of the axillary lymph node, radiotherapy and post-surgical seroma or infection and being obese are considered to be the important risk factors.<sup>4</sup> Although the majority of patients appear to develop BCRL before 12 to 24 months following surgery.<sup>5</sup>

Lymphedema in survivors of breast cancer may produce multiple kinds of symptoms, such as swelling, heaviness, tenderness, fatigue, numbness, aching, and rigidity.<sup>6</sup> Physical and psychological symptoms of BCRL, such as firmness of limb with limited ROM, restricted daily functions, and impeded psychosocial relationships/distress, leads to depression and functional impairment activity limitation, affecting their level of quality of life (QOL). Such signs and symptoms can cause unease and disrupt sleep.<sup>7</sup> Lymphedema is a long-term, persistent disorder determined through the formation of lymph fluid that is rich in protein in the interstitial spaces. It can lead to fibrosis, persistent inflammation, and recurrent infections. Lymphedema patients need lifelong care, medical and psychological support.<sup>6</sup> There are many physical therapy techniques/interventions that are effective in treating BCRL, and various modalities and therapeutic approaches have been introduced to control symptoms and reduce complications including ultrasound, cryotherapy, resistive exercise, intermittent pneumatic compression devices, laser therapy have been proposed to minimize upper extremity swelling and reduce its associated consequences.<sup>1, 8</sup>

Laurie Kilmartin et al reported in their studies that a Low Level Laser therapy (LLLT) have shown improvements for cancer survivors when employing it and the devices use to human tissues is supported by the postulated mechanisms of action. The research studies on the application of the laser at low power wavelengths indicate that it has effects at the cellular level include improved lymph angiogenesis, easier elimination of excessive fluid filled with proteins, and the formation of macrophage cells and the immune system, which reduce the probability of infection. According to research, LLLT is helpful at softening fibrous tissue and reducing pain and arm volume, break down scar tissue and increase ROM improving QOL in the breast carcinoma population.<sup>6</sup> Erika Joos et al reported that low-energy Extracorporeal shock wave therapy (ESWT) for BCRL proven that effectiveness of ESWT in the BCRL for all proved a significant decrease in the volume of lymphedema. Furthermore, advancements in the functional impairment and quality of life of study patients. There is no adverse events were reported. Over a 4 week period, study related efficacy of treatment was maintained.<sup>9</sup> Chunhui Wang et al. report Studies on moxibustion, a traditional Chinese medicinal method that involves applying heat, have shown that the local irritation it causes can control the neurological system's functions and enhance plasma flow in a lesion. The study found that moxibustion significantly reduced upper arm lymphedema. It improves plasma circulation and relieves inflammation and aching.<sup>10</sup> Maria Torres-Iacomba et al found that kinesiology taping (KT) seems least effective in treating secondary lymphedema. They have suggested that k-tape cannot take the place of traditional and standard multilayered bandaging and must not be an alternative choice for BCRL.<sup>11</sup>

Many studies are recently utilizing CDT (Congestive Decompression therapy) as a standard treatment for managing BCRL and were identified in the literatures. CDT is a combination of treatments consisting two phase. The intensive phase is the first phase, it comprises all 4 factors that therapists provide. They are manual lymphatic drainage (MLD), compression therapy such as multilayered low stretch bandaging, and specialized exercise arm and shoulder therapeutic exercises and activities, deep breathing exercises that encourage venous and lymphatic flow. The second phase which is maintenance phase and performed by the BCRL patient, who takes care of themselves, it consist of same components. According to the research reported, up to 40%–60% of patients with pitting edema experienced a volume reduction after CDT.<sup>12</sup> Exercise programs for lymphedema patients aim to regain range of motion (ROM), improve muscle strength, maximize upper extremity function, and reduce swelling. Even though CDT is the most frequently used treatment for lymphedema, it has been shown that combining methods results in a more thorough and effective course of care. Koo et al reported a greater improvement in individuals with BCRL following the combination of CDT and hyperbaric oxygen therapy (HBOT).<sup>13</sup> The current study's existence is anticipated to add knowledge and understanding about CDT and MLD as one of the effective non- invasive techniques to prevent lymphedema and its complications particularly among cancer survivors following the surgical resection.

## METHODOLOGY

Researching the consequences of CDT on BCRL on Google Scholar and PubMed and Science Direct, we looked into professional associations and societies that had published a guideline. In order to perform the search, we have used the keywords like breast cancer, complex decongestive therapy, manual lymphatic drainage, lymphedema.

Inclusion criteria:

- Randomized controlled trials, case study, double-blinded randomized comparison trial, prospective controlled study, intervention studies, single-blinded randomized controlled trial, pilot studies published between years 2019-2023.
- Studies which included participants with lymphedema after breast cancer.
- Studies with original research and various outcome criteria.
- Article published in English.

Exclusion criteria:

- Studies were excluded if they are published in languages other than English, were based on individuals with psychological/medical conditions. Furthermore, studies aiming solely on physical performance and literatures to the editor were also excluded.
- Studies that involve duplicate studies and abstract.
- Articles in language other than English.
- Articles published before 2019.

**REVIEW OF LITERATURE**

SL.NO	AUTHOR AND TITLE OF JOURNAL	YEAR	METHODOLOGY	RESULT	CONCLUSION
1.	<p>Didem Sezgin Ozcan, MD, Meltem Dalyan, Sibel Unsal Delialioglu, Cemile Sevgi Polat, MD, and Belma Fusun Koseoglu</p> <p>Complex Decongestive Therapy Enhances Upper Limb Functions in Patients with Breast Cancer-Related Lymphedema. Experimental study</p>	2018	<p>In total, 37 women (aged 53.6 - 11.2 (28-72)) involved in the study had breast cancer-related lymphedema (BCRL). Every single patient completed the CDT-phase I program, which involved thorough manual lymphatic drainage, dermatological care, corrective physical activity and compression bandages. Using circumferential measurements and a formula for a truncated cone, arm volume was determined. Every individual completed a baseline questionnaire that included sociodemographic information and clinical characteristics. As clinical assessment instruments, the DASH</p>	<p>The mean difference in oedema volume was 38.1% - 26.5%, and the mean post-treatment volume of the affected limb was lower than the pre-treatment amount (2741.81 - 696.85 and 2990.67 - 745.49, respectively). In upper extremities with lymphedema, we saw a significant decrease in ache and heaviness VAS values as well as an improvement in shoulder mobility. In comparison to pre-treatment, the mean DASH score was lower after therapy. Following the application of the CDT, all subcategories of the SF-36 characteristics improved. A body mass index above 30 and a short</p>	<p>For BCRL patients, CDT improves their life fulfillment and upper extremity functions. The elements that may have contributed include the decrease in lymphedema volume, pain, and heaviness, as well as the improvement in shoulder mobility.</p>

			questionnaire, the Short Form-36 , and for measuring pain and heaviness, the Visual Analogue Scale (VAS) was also used.	period of lymphedema were also linked to a larger improvement in upper extremity function, in addition to being younger than 65.	
2.	<p>Zeynep Tuba Bahtiyarca, Asli Can, Emel Eksioglu , Aytul Cakci.</p> <p>The addition of self-lymphatic drainage to compression therapy instead of manual lymphatic drainage in the first phase of complex decongestive therapy for treatment of breast cancer-related lymphedema: A randomized-controlled, prospective study</p>	2018	<p>A total of 24 BCRL patients were randomly assigned to accept CB or CB with SLD between January 2015 and January 2017. Based on the circumference measurements, the volume of the arm's edema was calculated. For upper extremity functions, the Hospital Anxiety-Depression Scale (HADS) was utilized, along with the SF-36 and the Quick Disabilities of the Arm, Shoulder, and Hand Questionnaire (Q-DASH). Prior to, during, and six months following the course of treatment, the patients were assessed.</p>	<p>At the completion of the treatment, a considerable volume reduction was seen in both groups' affected arms. Both groups showed numerically significant increases in their SF-36 and Q-DASH scores, but there was no significant change in their HADS-anxiety and depression subscale scores.</p>	<p>According to the findings of our investigation, compression therapy significantly reduces oedema during CDT's intensive phase. Additionally, it works well in the maintenance phase to maintain the volume that has already been achieved. SLD as opposed to MLD in the intense phase, however, might not offer more support for the therapy. We think that more extensive research is required to clarify the effects of SLD in intense phase of CDT in BCRL patients.</p>

<p>3.</p>	<p>Mihnea Peter BORDEA, Ruxandra EL-BSAT, Aniela NODITI.</p> <p>The role of physiotherapy treatment in arm lymphedema associated with breast cancer. Retrospective study</p>	<p>2021</p>	<p>Of the 32 patients, 18 underwent individualized counselling, education, manual lymphatic drainage, and compressive bandaging. The remaining 14 patients underwent the aforementioned procedures in addition to additional individual physiotherapy, which included shoulder strengthening exercises and stretches for the levator scapulae, trapezius, and pectoralis major and minor muscles. Using a retractable measuring tape, the diameter of both upper limbs was compared to determine the degree of arm lymphedema. The same person took the measures for the arm and forearm both before and after the physiotherapy regimen. Each patient's own file was maintained.</p>	<p>Early initiation of physiotherapy after modified radical mastectomy with axillary lymph node dissection, along with patient education, is associated with a higher regression rate of arm lymphedema compared to only patient education and awareness.</p>	<p>The treatment response rate was 85.7% in patients benefitting from lymphatic drainage, compressive bandage and an individual physiotherapy plan compared to 55.5% in patients only benefitting from lymphatic drainage and compressive bandage.</p>
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			<p>pathways and takes into account the anatomical and physiological characteristics of the lymphatic system. 10 to 15 repetitions with a 2 second duration each lymphatic drainage action are recommended.</p>		
4.	<p>Mahboobeh Hemmati, Zahra Rojhani-Shirazi and Zeinab Sadat Zakeri</p> <p>The effect of the combined use of complex decongestive therapy with electrotherapy modalities for the treatment of breast cancer-related lymphedema: a randomized clinical trial.</p>	2022	<p>39 people with unilateral BCRL were divided into one of three groups (n = 13) at random and assigned as follows: The control group received CDT and therapeutic ultrasound, while the faradic current groups also received CDT and ultrasound. Ten sessions of treatment were given to each individual. the affected person's functional impairment, pain severity, capacity, circumference (measured at five sites), and circumference.</p> <p>Both before and after therapy,</p>	<p>Following therapy, all three groups showed improvements in their functional impairment, pain, and lymphedema volume, and a significant difference between the groups existed (P 0.05). Although, the fact that there was no noticeable difference between the three groups in any site's changes in limb circumference after a session of treatment (P&gt;0.05).</p>	<p>For individuals with BCRL, combining CDT with electrotherapy instruments as faradic current or ultrasonography can lead to a higher decrease in lymphedema volume, discomfort, and functional impairment.</p>



			upper extremities were assessed.		
5.	<p>Alexios Klonis BSc (Hons), Marina-Eleni Kloni BSc, MSc, MA, MSCP, Prodromos Papapavlou.</p> <p>Effects of early Manual Lymphatic Drainage in the prevention of secondary lymphoedema in breast cancer patients. A literature Review</p>	2022	<p>A search for RCT published from 2010 onwards was done using PubMed, PEDro (Physiotherapy Evidence Database), Cochrane Central Register of Controlled Trials, and Google Scholar. Ultimately, 7 RCTs including 622 patients were found. The majority of research yielded encouraging findings regarding MLD's preventative effects.</p>	<p>In overall 7 RCTs with 622 patients were recognized. Most of the studies exposed favourable results for the preventive effect of MLD.</p>	<p>Many of the studies examined in this analysis point to a possible protective impact of MLD on the development of secondary lymphedema in breast malignancy survivors. However, more comprehensive research is required to identify the subpopulations of breast cancer survivors who will benefit the most from Manual Lymphatic Drainage, as well as the timing and length of treatment.</p>
6.	<p>Elif Duygu-Yildiz, Yesim Bakar, Mustafa Hizal.</p> <p>The effect of complex decongestive physiotherapy applied with different</p>	2023	<p>The study included 21 subjects with stage 2 unilateral BCRL. People were divided into two groups at random: low-pressure(n=11) and high-pressure (n = 10). From six</p>	<p>Skin thickness significantly decreased in the high-pressure bandage group at the volar reference of the extremity and in the high-pressure bandage group, the</p>	<p>The lower portion of your hand and arm responded better to high pressure in terms of lowering subcutaneous tissue thickness.</p>

<p>compression pressures on skin and subcutaneous tissue thickness in individuals with breast cancer-related lymphedema: a double-blinded randomized comparison trial.</p>		<p>reference points (hand, wrist, forearm, arm, and forearm dorsum), volumetric dimension, Pittsburgh Sleep Quality Index, Patient benefit Index-Lymphedema, and VAS, respectively, were used to evaluate membrane and subcutaneous tissue thickness, extremity capacity, standard sleep, treatment benefit and comfort. For both groups, extensive decongestive physiotherapy was used. They applied compression bandages in accordance with their team. People were assessed by the point of departure, the first session, the tenth session, the twentieth session, and the three-month follow-up.</p>	<p>thickness of the subcutaneous tissue considerably reduced at each reference point (p 0.05). With the exception of the hand and arm dorsum in the low-pressure bandage group, skin thickness changed at all sites. With the exception of the forearm dorsum and the arm dorsum, all locations reported a reduction in subcutaneous tissue thickness (p0.05). In the group of high-pressure bandages, oedema subsided more quickly. There were no appreciable differences in either group's comfort levels, treatment effectiveness, or quality of sleep.</p>	<p>It is highly advised to use high pressure while treating oedema is difficult to see in the back of the hand and arm treat. Additionally, if desired, A bandage with high pressure can be utilized to reduce volume quickly and to help in oedema resolution. Using a high-pressure bandage may increase treatment results without compromising comfort, sleep quality, or the therapeutic effect.</p>
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**RESULT AND DISCUSSION**

BCRL is a continuing challenge for many survivors. There are numerous therapies available for treating lymphedema, although the quality of the evidence varies. Complex decongestive therapy is a typical

lymphedema management. Physician can also aid their patients by referring them to accomplished health care providers like physical therapists. In the previous, physicians presumed that breast cancer patients must circumvent exercise, and literature designating that exercise can cause or aggravate lymphedema still exists. MP Bordea et al reported that the treatment response rate was 85.7% in patients benefitting from lymphatic drainage, compressive bandage and an individual physiotherapy plan compared to 55.5% in patients only benefitting from lymphatic drainage and compressive bandage. Exercise, which should be performed at a moderate intensity and with minimal repetitions, also supports the function of the muscle pump. Elif Duygu-Yildiz et al proved that the dorsum of the forearm and hand responded better to excessive pressure in terms of lowering subcutaneous tissue thickness. It is highly advised to use high pressure while treating lymphedema in the dorsum of the hand and forearm that is challenging to treat. Additionally, if desired, a high-pressure dressing could be utilized to reduce volume quickly and to help in edema resolution. Using a high-pressure bandage may increase treatment results without compromising comfort, sleep quality, or the therapeutic effect.

The implementation of MLD appears to have prophylactic consequence when only combined with exercise, and the available results do not support the use of MLD as a sole primary prophylactic technique. During the initial months of strength training, supervision from an accredited exercise therapist is also suggested to ensure the safe and efficient completion of the exercises.

## CONCLUSION

This review study concludes that effect of CDT on following breast cancer surgery is helpful in controlling lymphedema. Most of the studies reviewed in this analysis point to manual lymphatic drainage as a treatment that reduces the risk of subsequent lymphedema in breast cancer survivors. MLD, on the other hand, has the ability to release body tissue, rapidly ameliorate the condition locally, and increase the effectiveness of CDT. Combined techniques produce the furthestmost propitious effects and are relying on the pathophysiology of lymphedema. Additionally, it works well in the maintenance phase to maintain the volume that has already been achieved.

## CONFLICTS OF INTERESTS

There are no reported conflicts of interests.

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