JOURNAL OF COMPLEMENTARY MEDICINE RESEARCH

RESEARCH ARTICLE

Vodder Manual Lymphatic Drainage versus Casley-Smith Manual Lymphatic Drainage on Lymphedema post Mastectomy

ROSTOM EH, PHD, PT, CLT[1,2,3], ALFEKY FM, PHD, PT[4], EL SAYED DG, PHD, PT[5]*

[1]*Department of Physical Therapy for Surgery, Faculty of Physical Therapy, Cairo University, Cairo, Egypt*

[2]*Department of Physical Therapy, Faculty of Medical Rehabilitation Sciences, Taibah University, Almadinah Almunawwarah, KSA*

[3]*Certified Lymphatic Therapist*

[4]*Department of Basic Science, Faculty of Physical Therapy, Benha University, Egypt*

[5]*Department of Physical Therapy for Surgery, Faculty of Physical Therapy, MTI University, Cairo, Egypt, Email: dr.dalia_pt@yahoo.com*

**Corresponding Author*

ABSTRACT

Introduction: After a mastectomy, lymphedema is a possible side effect. The improvement of the lymphatic system is the most important aspect of Lymphedema treatment. Lymphedema can be treated effectively with manual lymphatic drainage (MLD).

Aims: The core of the current study is to draw a comparison that highlights the effects of the Vodder MLD and the Casley-Smith MLD on post-mastectomy lymphedema.

Methods: For the study, thirty female patients with post-mastectomy lymphedema were divided into two equal groups at random. Vodder MLD Technique, Pneumatic Compression Pump, and Bandage were given to Group (A). Casley-Smith MLD Technique, Pneumatic Compression Pump, and Bandage were given to Group (B). Each participant's intervention lasted eight weeks, with three sessions every week.

Results: The results showed that employing two distinct treatment procedures improved both groups significantly ($P < 0.001$). There is not a clear disparity between the two study categories ($P > 0.05$).

Conclusion: The MLD techniques of both Vodder and Casley-Smith are helpful in providing a treatment for the lymphedema post mastectomy. There is no difference between the two techniques. Subsequently, any MLD technique is highly recommended to produce better results in lymphedema therapy after mastectomy.

KEYWORDS:
Vodder Manual Lymphatic Drainage, Casley-Smith Manual Lymphatic Drainage, Lymphedema, Mastectomy, Mastectomy related lymphedema, Manual lymphatic Drainage Techniques.

ARTICLE HISTORY:
Received Oct 15, 2021
Accepted Nov 02,2021
Published Dec 09, 2021

DOI:
10.5455/ jcmr.2021.12.04.27

VOLUME: 12
ISSUE: 4
ISSN: 2146-8397

INTRODUCTION

Lymphedema is the accumulation of excessive lymph fluid in the subcutaneous tissues because of the lymphatic system's inadequate transit capacities (LE). A dysfunction of the lymphatic vessels might result in insufficient lymphatic transport. 1 Lymphedema is the most feared adverse effect of breast cancer surgery. Various results are expected whether functional, cosmetic, or psychological issues and complications. The previously mentioned results would lead to reducing the patients' quality of life and raising the risk of infection. 2

New cases of breast cancer are being diagnosed all over the world. Mastectomy, chemotherapy, endocrine therapy, and radiation therapy are all used to treat breast cancer, but each of these treatments has its own set of side effects. Lymphedema, a persistent illness that can be difficult for both patients and clinicians, is a possible side effect after mastectomy. 3,4

Lymphedema is a difficult condition to recover from. A mainstay of current medical care is Complete Decongestive Therapy. The medical care process includes a spectrum of techniques; compression bandages, skin care, exercise, and

manual lymphatic drainage (MLD). 5 Fat re-accumulation and excess limb volume can be reduced with pneumatic compression. Various academic studies have demonstrated that intermittent pneumatic compression (IPC) can aid lymphedema patients. 6

Decongestive lymphatic therapy (DLT) was agreed upon by the Foldis, Leduc, Vodder School, and Casley-Smith schools of medicine in New York in February 1998 as a suitable term for this treatment. The basics were agreed upon, but the naming of the lymphatic massage component was a point of disagreement. Manual Lymphatic Therapy (MLT) was chosen by Foldis and Casley-Smith. Manual Lymphatic Drainage (MLD) is chosen by Leduc and the Vodder School. While the fundamentals of each school of therapy are the same, the massage techniques differ. You may only choose among them by comparing the outcomes of treatments that have been carefully examined and published. 7

The objective of implementing the technique of Vodder Manual Lymphatic Drainage is to raise the efficacy of the lymphatic pumps via using a combination of pressure with manual pushing. It is a process defined to be a manual contact. In the treatment process, it is expected to use hands to alter the skin in the direction of lymphatic flow by pushing or stretching it in that direction. Light pressure is performed without causing redness. The pressure phase is followed by the relaxation stage. During relaxation phase, hand contact with the skin is maintained without applying pressure. Fixed circles, pumps, roatary, and scoop are the four primary strokes used by the Vodder technique in various patterns. 8

Casley-Smith MLD Technique is centered on the idea of first emptying the truncal zones so as to get an empty reservoir wherein lymph from the periphery could flow. The massage of the limbs begins after that. Proximal region is contraindicated, starting at the distal end and attempting to push the lymph into the unemptied. Additional deep abdominal therapy from a qualified therapist may help to cleanse this area and provide a greater reservoir for drainage from the thoracic quadrant. 7

MATERIALS AND METHODS

Design

The current study is a randomly done trial that was conducted on postmastectomy lymphedema patients who were recruited from surgery clinics. All of the patients have signed a written, informed consent.

The participants were subdivided into two main groups. Each group has obtained one of the two proposed treatment methods. On one level, Group A obtained Vodder MLD Technique, Pneumatic Compression Pump, and Bandage. On the other level, Group B obtained Casley-Smith MLD Technique, a Pneumatic Compression Pump, and a Bandage. During the randomization process, closed envelopes mode was used. Thirty sealed envelopes were prepared attached with a card indicating to which group does the participant belong. Each participant received an envelope stating whether they were in group A or group B.

Group comparisons were done at the beginning of the treatment process and by the end of the eight weeks therapy. The therapies lasted an average of 8 weeks for each participant, with three sessions per week.

Participants

Participants in the current study had secondary lymphedema after complete mastectomies and were treated at the Surgery Clinic. The study included thirty female patients who were getting physical therapy treatments. There were no pathological abnormalities that could have affected the results, such as limb infection, local or proximal malignancy, anticoagulated individuals, or deep vein thrombosis. Their mean age was 38 years. Patients with skin diseases were not allowed to participate in the trial.

Material and Measurement Tools

Vodder MLD Technique

Stationary circles, pumps, and strokes were done on the patient's skin and subcutaneous tissue with extremely light pressure and hand motions. The lymph nodes, anastomosis, abdomen, and afflicted limb were all subjected to 40 minutes of pressure. The limb's proximal portion is always cleansed first, then the drainage is extended distally. Also, the pressure was applied to each region from distal part to proximal part.

Casley-Smith MLD Technique

Before massaging the affected limb for 10 minutes, the therapist massaged the trunk and lymphotomies close to the afflicted limb for 30 minutes, providing the lymph from the periphery somewhere to go. Starting from the distal end and pushing the lymph into the unemptied, proximal sections is not suggested.

Pneumatic Compression Pump

The subject was then compressed for 30 minutes using a pneumatic compression pump. The device was turned on, the afflicted limb was placed in a specified sleeve, time (30 minutes), pressure (lowest pressure program 1), and mode (sequential) were all recognized, and the start button was activated. The research apparatus was designed and built in Japan. Rated 30 minutes, 220 volts, 50/60 Hz, 25/23 watts, No 60200357session. The gadget was turned off at the end of the session.

Bandage

Stocking net, finger gauz, cotton (Cilona), Komprex on ulnar and radial styloid processes foam (Rosidal), and low elasticity bandage of various widths were utilized to create a multilayer padding system. Bandages were six centimeters for the area of the hand and eight centimeters for the rest of the extremity.

Procedures

After performing an initial evaluation, the participants were divided into two groups. Each group has adopted one of the two proposed techniques. All the participants have started the treatment on the same appointments with three sessions weekly for a period of eight weeks.

The following ethical issues were being considered:

1. The patients have received a full description of the treatment process; they got the knowledge of the treatment's aim and all the possible benefits of this special type of treatment.
2. The measurements of all the selected participants were examined before starting the treatment process.
3. The previously mentioned measurements are supposed to be examine before starting the treatment process, after eight subsequent weeks of treatment and by the end of the treatment program.
4. A comfortable position enabling the participant to see the affected area is one of the basic criteria of the treatment process.

According to the following steps, Group (A) (n=15) obtained the Vodder MLD Technique, a pneumatic compression pump (PCP), and a bandage:

- The therapist used stationary circles, pumps, and strokes on the patient's skin and subcutaneous tissue with extremely light pressure and hand motions. The lymph nodes, anastomosis, abdomen, and afflicted limb were all subjected to 40 minutes of pressure. The proximal section of the diseased limb is cleansed continuously first, followed by the drainage being extended distally and pressure being applied to every location from distal to proximal.

- Each of the fifteen patients was given 30 minutes of PCP. The device was turned on, the affected limb was per skin and fitted into a specified sleeve, the time (30 minutes), pressure (the lowest pressure program 1), and mode (sequential) were identified, and the start button was activated. The device was turned off at the end of the session.

- Apply bandaging with stocking net and finger gauz, then cotton padding (Cilona). For the upper limb, apply Komprex to the ulnar and radial styloid processes, then foam (Rosidal), then a less elastic bandage (Comprilan) of various widths. Bandages were six centimeters for the area of the hand and eight centimeters for the rest of the extremity).

Casley-Smith MLD Technique, Pneumatic Compression Pump (PCP), and Bandage were given to Group (B) (n=15) according to the following steps:

- The therapist used gentle pressure on the patient's skin and subcutaneous tissue. The pressure was applied for 40 minutes, with 30 minutes for the trunk and 10 minutes for the affected limb. The pressure was applied to distal end with attempting to push the lymph into the unemptied, proximal regions are contraindicated.

- Each of the fifteen patients was given 30 minutes of PCP. The device was turned on, the diseased limb was placed in a specified sleeve, time (30 minutes), pressure (lowest pressure program 1), and mode (sequence) were all identified, and the start button was activated. The device was turned off at the end of the session.

- Apply bandaging with stocking net and finger gauz, then cotton padding (Cilona). For the upper limb, apply Komprex to the ulnar and radial styloid processes, foam (Rosidal) followed by a less elastic bandage (Comprilan) with various width. Bandages were six centimeters for the area of the hand and eight centimeters for the rest of the extremity.

Edema Assessment

Tap Measurement was utilized in order to compare groups at the olecranon level, 5 cm above and 5 cm below the same reference point for both groups. This kind of assessment was done at the first session of treatment at by the end of the treatment process.

Data Analysis

Participants' age was compared using an unpaired t-test. To ensure that the data had a normal distribution, the Shapiro-Wilk test was utilized successfully. Levene's examination for homogeneity of variances has been applied on the current study to detect group homogeneity. A mixed design MANOVA was used so as to figure out the possible within and between groups' effects on limb circumference at the olecranon level, above elbow 5 cm, and below elbow 5 cm.

post-hoc testing with the Bonferroni correction was employed for future comparisons and studies. The significance indicator for the required statistical tests was set at ($p < 0.05$). Also, the statistical package for social studies (SPSS) version 25 for Windows was used successfully (IBM SPSS, Chicago, IL, USA).

RESULTS

Subject Characteristics

This study included thirty ladies with upper limb lymphedema. Group A's mean SD age was 37.86 ± 3.96 years, whereas group B's mean value was 38.53 ± 3.09 years. Regarding age in both categories, there was no significant difference ($p > 0.05$).

Effect of Treatment on Limb Circumference

Treatment and time had a significant interaction ($F (3,26) = 17.13$, $p = 0.001$, $= 0.66$). The main effect of time was considerably significant ($F (3,26) = 381.18$, $p = 0.001$, $= 0.97$). Also, the main impact of treatment was not significant (F

(3,26) = 0.02, p = 0.99, = 0.002).

Within Group Comparison

The upper limb circumference at the olecranon level, above elbow 5 cm, and below elbow 5 cm of groups A and B decreased significantly after treatment compared to pretreatment (p > 0.001). Group A had 6.51, 6.29, and 6.27 % change in upper limb circumference at olecranon level, above elbow 5 cm, and below elbow 5 cm respectively, while group B had 4.58, 3.81, and 4.43 % change in upper limb circumference at olecranon level, above elbow 5 cm, and below elbow 5 cm respectively as highlighted in (table 1, figure 1).

Between Groups Comparison

As for the pre-treatment stage, there is no significant difference between the two groups (p > 0.05). Also, there is no significant difference in the upper limb circumference at the olecranon level, above elbow 5 cm, and below elbow 5 cm between both groups A and B after treatment (p > 0.05) as shown in (table 1, figure 1).

Table 1: Mean limb circumference pre and post treatment of group A and B:

	Group A	**Group B**		
	Mean ±SD	**Mean ±SD**	**MD (95% CI)**	**P value**
Limb circumference (cm)				
Olecranon level				
Pre treatment	**57.26 ± 1.53**	**56.73 ± 1.62**	**0.53 (-0.64: 1.71)**	**0.36**
Post treatment	**53.53 ± 1.59**	**54.13 ± 1.55**	**-0.6 (-1.77: 0.57)**	**0.31**
MD (95% CI)	**3.73 (3.35: 4.11)**	**2.6 (2.21: 2.98)**		
% of change	**6.51**	4.58		
	p = 0.001	**p = 0.001**		
Above elbow 5 cm				
Pre treatment	**58.33 ± 1.67**	**57.73 ± 1.57**	**0.6 (-0.61: 1.81)**	**0.32**
Post treatment	**54.66 ± 1.79**	**55.53 ± 1.64**	**-0.87 (-2.15: 0.42)**	**0.17**
MD (95% CI)	**3.67 (3.32: 4.01)**	**2.2 (1.85: 2.54)**		
% of change	**6.29**	**3.81**		
	p = 0.001	**p = 0.001**		
Below elbow 5 cm				
Pre treatment	**56.26 ± 2.01**	**55.8 ± 1.89**	**0.46 (-0.99: 1.93)**	**0.52**
Post treatment	**52.73 ± 1.98**	**53.33 ± 1.95**	**-0.6 (-2.07: 0.87)**	**0.41**
MD (95% CI)	**3.53 (3.16: 3.9)**	**2.47 (2.1: 2.83)**		
% of change	**6.27**	**4.43**		
	p = 0.001	**p = 0.001**		

SD, Standard deviation; MD, Mean difference; CI, Confidence interval; p-value, Level of significance.

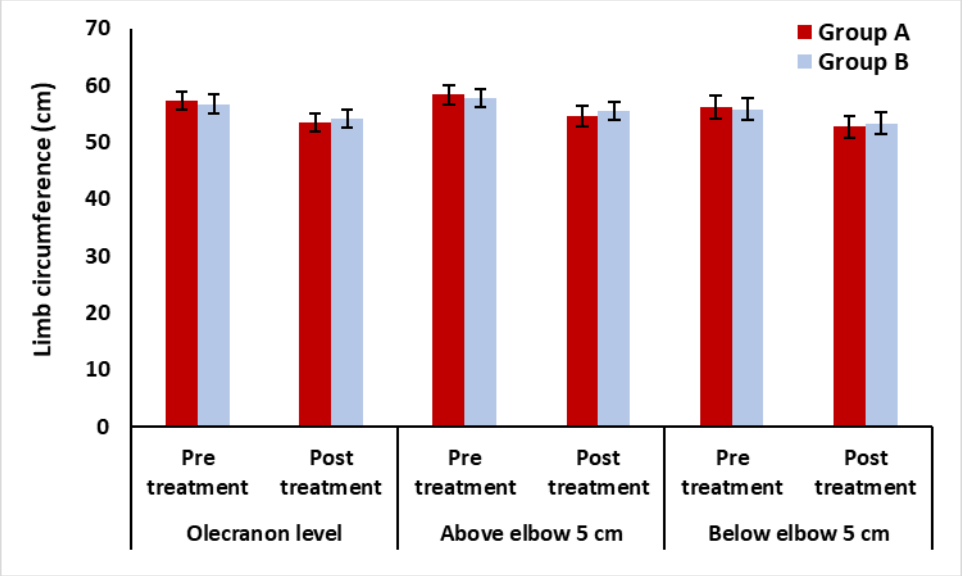

Fig.1: Mean Limb circumference at olecranon level, above elbow 5 cm and below elbow 5 cm. Before and After the Treatment Process of the two groups.

DISCUSSION

Manual Lymphatic Drainage (MLD) is considerably a special manual therapy on the basis of a lymphatic anatomy. It is thought to function by enhancing fluid mobility in the body. Furthermore, it can stimulate the lymphangion's natural peristaltic contractions. MLD is thought to assist nature by enhancing the lymphangion's normal peristaltic contractions. It plays a vital role in lowering the swelling through activating lymphangion pumping, decreasing hydrostatic resistance to lymph flow and pushing lymph away from stasis and into lymphatic vessels.9

Manual Lymphatic Drainage is commonly regarded a safe and potential treatment for the lymphedema. Also, it may help prevent clinical lymphedema in the early stages after breast cancer surgery. When compared to alternative treatment ways and techniques, some studies have figured out the role of MLD on reducing the volume and decreasing symptom-related impacts. 10

The researchers provided two manual lymphatic drainage techniques in two different groups, the first receiving Vodder MLD and the second receiving Casley-smith MLD, and by analyzing differences in each group before and after treatment, the results proved that statistically significant improvements in lymphedema at all measurement levels were observed in both groups when compared to baseline scores. On the other level, they conducted a comparison between two groups in order to determine the optimum strategy for improving post-mastectomy lymphedema, and the results revealed no statistical difference between the two groups.

A study evaluated the efficacy of multi-layer compression bandaging and complex decongestive therapy with Vodder manual lymphatic drainage for treating lymphedema. The study included 103 people, all of whom were 60 years old and had unilateral lower limb lymphedema. The patients were divided into two main groups: 50 have got complex decongestive therapy (CDT) and the other fifty-three patient have obtained multi-layer compression bandaging (MCB). Before and after treatment, the average and maximum circumference of the edematous extremities, as well as the body mass index (BMI), were all measured. According to the data, swelling was reduced in both groups after 15 sessions. Using the two treatment techniques, the volume and circumference of the limbs got significantly reduced. 11

Another study used Near-Infrared Imaging so as to investigate the effects of Casley-Smith manual lymphatic drainage and how the compression garment treatment could affect the lymphatic function. On nine healthy volunteers, Casley-Smith manual lymph drainage was used altogether with a 10-minute compression garment therapy session.

NIR fluoroscopy was employed with a microdose (50 lL, 0.05 percent w/v) of indocyanine green to examine lymphatic activity before and after the treatment process. The criteria of number, size, displacement, and speed of lymph packets were used to describe lymphatic function. All of the previously mentioned criteria differed significantly among participants based on baseline (BL) lymph function characteristics. Despite this, both therapies revealed statistically significant ($p < 0.05$) improvements in forearm displacement and speed in comparison to BL. According to the data, lymphatic activity increased considerably after manual lymphatic drainage. 12

Furthermore, 201 patients with chronic Breast Cancer Related Lymphedema first or second stage participated in a study. The affected arms and hands, stage one or two lymphedema, were studied utilizing a double-blinded three-group randomized controlled experiment. The identical treatment was given to all of the participants, which comprised skin care, compression therapy, exercises, and educational resources. Manual lymphatic drainage (MLD) technique only differed across the three categories: the intervention category had a fluoroscopy-guided MLD, the control category one had a standard MLD, and the control category two had a placebo MLD. All subjects got daily intensive treatments for three weeks, followed by six months of maintenance treatment. The main goals were to reduce lymphedema volume in the arm and hand, as well as to modify lymph fluid stagnation at the shoulder/trunk level. The arm volume was calculated using water displacement technique for one hand and for the other hand, circumference measurements were utilized. The results showed that fluoroscopy-guided MLD and regular MLD were more successful than placebo MLD. 13

Another study has compared the decrease in lymphedema after mastectomy in the advanced cases. The study had indicated a twenty percent limb volume disparity. Sixty postmastectomy women were divided into 2 groups at random. The first group was treated with compression bandaging and physical activities, whereas the second group received the same treatment plus 30 minutes of Vodder Manual Lymphatic Drainage. The intensive phase lasted two weeks, while the maintenance phase lasted six months for both groups. During the intensive period, a decrease in limb and edema volumes are noticeable. After 6 months of maintenance therapy, both groups' improvements were stable. Both groups' health-related quality of life as certified via a Lymphedema Questionnaire have improved, with high levels of treatment satisfaction. According to the findings, both strategies can produce improvement of lymphedema.14

There has been a study which compared the effectiveness of Complete Decongestive Therapy (CDT) with manual lymphatic drainage (MLD) versus CDT. Both techniques are used in the treatment process of arm lymphedema. Arm Lymphedema is common among breast cancer cases. Patients were given treatment twice a week for four weeks and were randomly allocated to either a therapy that included MLD (T+MLD) or a treatment that did not include MLD (T−MLD). After seven months of follow-up, a reduction in the volume of arm was noticeable. Volume loss after treatment, arm circumference, patient's feeling of heaviness, stress, and health status were all secondary outcomes of the treatment process. The amount

of lymphedema in both groups decreased rapidly, with no difference between them. Hence, Manual lymphatic drainage doesn't add more reduction in the arm volume in case of lymphedema in patients with breast cancer according to the findings. 15

CONCLUSION

Manual lymphatic drainage can be done in a variety of ways. The Vodder Technique and the Casley-Smith Technique were compared in this study. Both approaches are successful in the treatment of lymphedema postmastectomy, according to the study, but there was no significant difference between them. Therefore, any strategy, whether Vodder MLD or Casley-Smith MLD, is advised to get improved lymphedema results postmastectomy.

ACKNOWLEDGEMENT

The authors acknowledge the immense help received from responsible authorities in the involved settings and the participants in the study.

CONFLICTS OF INTEREST

NIL

SOURCE OF FUNDING

NIL

AUTHORS' CONTRIBUTIONS:

Rostom EH, Alfeky FM & El Sayed DG: Participated in the design of the study and approval of the final version of the manuscript. Rostom EH, Alfeky FM & El Sayed DG: Interpretation of results. Rostom EH, Alfeky FM & El Sayed DG: Statistical analysis of data.

REFERENCES

1. Fu MR. Breast cancer-related lymphedema: Symptoms, diagnosis, risk reduction, and management. World J Clin Oncol. 2014;10;5(3):241-7.
2. Amy E. Rivere, V. Suzanne Klimberg. "Lymphedema in the postmastectomy patient: pathophysiology, prevention, and management." The Breast (Fifth Edition), Elsevier, 2018;514-530, e4.
3. Kareen A and Catherine P:" Lymphedema after treatment of breast cancer: a comprehensive review. J Unexplored Med Data, 2019;4:5
4. Miller CL, Specht MC, Skolny MN, Horick N, Jammallo LS, O'Toole J, Shenouda MN, Sadek BT, Smith BL, Taghian AG. Risk of lymphedema after mastectomy: potential benefit of applying ACOSOG Z0011 protocol to mastectomy patients. Breast Cancer Res Treat. 2014;144(1):71-7.
5. Maul SM, Devine JA, Wincer CR. Development of a framework for pneumatic device selection for lymphedema treatment. Med Devices (Auckl). 2009;2:57-65.
6. Aldrich MB, Gross D, Morrow JR, Fife CE, Rasmussen JC. Effect of pneumatic compression therapy on lymph movement in lymphedema-affected extremities, as assessed by near-infrared fluorescence lymphatic imaging. J Innov Opt Health Sci. 2017;10(2):1650049.
7. Casley-Smith JR, Boris M, Weindorf S, Lasinski B. Treatment for lymphedema of the arm--the Casley-Smith method: a noninvasive method produces continued reduction. Cancer. 1998;15;83(12 Suppl American):2843-60.
8. Zuther J. E , & Norton S : "Lymphedema Management: The Comprehensive Guide for Practitioners", 3rd ed. Stuttgart, Germany: Georg Thieme Verlag, 2013.
9. Ezzo J, Manheimer E, McNeely ML, Howell DM, Weiss R, Johansson KI, et al. Manual lymphatic drainage for lymphedema following breast cancer treatment. Cochrane Database Syst Rev. 2015;21(5):CD003475.
10. Thompson B, Gaitatzis K, Janse de Jonge X, Blackwell R, Koelmeyer LA. Manual lymphatic drainage treatment for lymphedema: a systematic review of the literature. J Cancer Surviv. 2021;15(2):244-258.
11. Zasadzka E, Trzmiel T, Kleczewska M, Pawlaczyk M. Comparison of the effectiveness of complex decongestive therapy and compression bandaging as a method of treatment of lymphedema in the elderly. Clin Interv Aging. 2018;14;13:929-934.
12. Lopera C, Worsley PR, Bader DL, Fenlon D. Investigating the Short-Term Effects of Manual Lymphatic Drainage and Compression Garment Therapies on Lymphatic Function Using Near-Infrared Imaging. Lymphat Res Biol. 2017;15(3):235-240.
13. De Vrieze T, Vos L, Gebruers N, Tjalma WAA, Thomis S, Neven P, et al. Protocol of a randomised controlled trial regarding the effectiveness of fluoroscopy-guided manual lymph drainage for the treatment of breast cancer-related lymphoedema (EFforT-BCRL trial). Eur J Obstet Gynecol Reprod Biol. 2018;221:177-188.
14. Tomasz G, Katarzyna O and Joanna K: "Complex Decongestive Lymphatic Therapy With or Without Vodder II Manual Lymph Drainage in More Severe Chronic Postmastectomy Upper Limb Lymphedema: A Randomized Noninferiority Prospective Study". J of Pain & Sym Manag, 2015; 50(6): 750-757.
15. Tambour M, Holt M, Speyer A, Christensen R, Gram B. Manual lymphatic drainage adds no further volume reduction to Complete Decongestive Therapy on breast cancer-related lymphoedema: a multicentre, randomised, single-blind trial. Br J Cancer. 2018;119(10):1215-1222.