Available online freely at www.isisn.org

Bioscience Research

Print ISSN: 1811-9506 Online ISSN: 2218-3973

Journal by Innovative Scientific Information & Services Network

RESEARCH ARTICLE BIOSCIENCE RESEARCH, 2019 16(2): 1876-1881. **OPEN ACCESS**

Kineso-Taping versus Pneumatic Compression Pump on Lymphedema post Mastectomy

Esraa Hany Rostom[1] and Dalia Galal El Sayed[2]

[1]Surgery P.T Department, Faculty of Physical Therapy, Cairo University **Egypt**
[2]Surgery P.T Department, Faculty of Physical Therapy, MTI University. **Egypt**

.
***Correspondence:** **dr.dalia_pt@yahoo.com, esraarostom@gmail.com** **Accepted: 0**4 May 2019 **Published online:** 03 June. 2019

The aim of the present study was to compare between Kineso-taping and Pneumatic Compression Pump on Lymphedema post Mastectomy. Thirty female patients with lymphedema post mastectomy participated in the study, they were randomly divided into two equal group. Group (A) received Kineso-Taping, Bandage and MLD. Group (B) received Pneumatic Compression, Bandage and MLD, The duration of the interventions was 8 weeks per participant, and each participant received 3 sessions per week. The results of the study revealed that there was a significant improvement in both groups by using two different methods of treatment but there was no significant difference between the two study groups (p value = o.36) So Combination therapy between Kineso-taping and Pneumatic Compression Pump is recommended to achieve better improvement.

Keywords: Lymphedema- kineso-taping – Pneumatic Compression Pump - Mastectomy

INTRODUCTION

Lymphedema, a condition which ordinarily affects the extremities, is characterized by accumulation of protein-rich fluid in the soft tissues due to malfunction of the lymphatic system. The normal role of the lymphatic system is to passively convey and actively pump interstitial fluid back into the blood stream. Primary (congenital) lymphedema arises from poorly understood factors, while secondary lymphedema is caused by another known disease. Most often, upper extremity secondary lymphedema is the result of breast cancer, with an incidence of 15-20% among female breast-cancer patients who have undergone a mastectomy or radiation as part of therapy (Muluk and Taffe , 2016).

Decongestive lymphatic therapy is common management for lymphedema. A program combining skin care, manual lymphatic drainage, exercise, and compression therapy (multilayer bandage or garment) is recognized as the best practice in lymphedema management (Kase et al., 2008).

The treatment of lymphedema is difficult. A mainstay of current medical care is Complete Decongestive medical care (CDT), which incorporates the utilization of compression bandages, skin care, exercise and Manual humor drain (MLD). MLD could be a massage conducted by a trained expert and designed to stimulate lymph flow within the limb. Pneumatic Compression Devices (PCDs) have conjointly been utilized in the management of lymphedema. PCDs lymphedema square measure accustomed promote humor and blood vessel return from distal elements of the body back to proximal areas. The best PCDs have one sleeve which alternately compresses and decompresses. a lot of complicated PCDs have multiple, programmable sleeves. A minimum of one PCD uses a programming rule that's designed to mimic

MLD (Maul et al., 2009). PC can significantly reduce limb volume among post- mastectomy lymphedema patients (Muluk and Taffe, 2016).
The researchers found that PCD medical aid reduces limb volume for each higher and lower extremity edema. However any conclusions regarding the purposeful and QOL edges of PCD are tenuous at now. We tend to conjointly known evidence that PCD treatment results in reduced care resource utilization and episodes of redness. Finally it's unsure whether or not PCD medical aid can effectively replace and/or supplement CDT, however there are enough data to support the thought that PCD ought to be thought of as a viable option once patients cannot receive or fail CDT. Due to variable methodologies and endpoints among existing studies, there remains a great would like for top quality studies of PCD medical aid. These studies should embrace (1) comparative analysis of various forms of pumps; valid endpoints, together with each limb volume and QOL measurements (Muluk and Taffe 2016).

The Kinesio Taping (KT) has become an alternative treatment for lymphedema volume reduction. KT was effective on post-mastectomy lymphedema related to breast cancer; however, it is not more efficient than other treatments (Kasawara et al., 2018).

MATERIALS AND METHODS

Design

The current study was a randomized control trial with participants randomly assigned to one of two treatment groups: Group (A) received Kineso-Taping, Bandage and MLD. Group (B) received Pneumatic Compression, Bandage and MLD; the researchers made group comparisons at the initial visit and after 8 weeks. The duration of the interventions was 8 weeks per participant, and each participant received 3 sessions per week.

Participants

The current study was performed on Participants with secondary lymphedema post total mastectomies that were treated in Surgery Clinic. Thirty female patients undergoing physical therapy treatments were participated in the study .There were free from any pathological condition like limb infection, local or proximate malignancy, anti-coagulated patients, and deep vein thrombosis that might affect the results. Their mean age was 45 years. Patients with skin diseases were excluded from the study .

Material and Measurement Tools

Manual Lymphatic Drainage (MLD)

The affected limb was per skin and the therapist applied very soft pressure with hand motions on the skin and subcutaneous tissue of the patient. Applied pressure was from distal to proximal for 50 min.

Bandage

Handy Grip Cohesive bandage 10cm × 2.1m (4.5m stretched) made in Germany. REF No.9460 was applied after each session for all patients. Multilayered low-stretch compression bandaging is applied immediately after manual lymph drainage. Bandages are wrapped from the fingertips to the axilla in layers to create high pressure gradient at the most distal part of the limb that gradually decreases proximally.

Pneumatic Compression Pump

Then patient received compression through pneumatic compression pump for 30 min. The affected limb was per skin and was entered in specific sleeve, the device was switched on, then time (30 min), pressure (the lowest pressure program 1), and mode (sequential) were detected then the start button was switched on.–The device that used in the study was made in Japan. 220V, 50/60HZ, 25/23 W. Rated 30 min. No 60200357session the device was switched off.

Kinesio Tape

Kinesio taping (KT) for lymphatic drainage is a new choice in the field of physical therapy. The material used for the KT and the original concept of the taping technique were introduced by Dr Kenso Kase in 1973. K-tape had been designed to allow 30-40% longitudinal stretch (Ashforth et al., 2015).

ABN Kinesio Tape: cotton material 5cm × 5m made in Egypt with elasticity ratio 1:1.7, adhesive strength 5N and fabric weight 90 g/sqm (Fan Cut application).

Procedure

Participants who met the inclusion criteria were randomly assigned into 2 groups, after initial evaluation participants began the treatment on the same day. Participants received 3 sessions per week for 8 weeks .

The following ethical issues were being considered:

1-Before starting treatment, all patients received full explanation to the purpose of the treatment, the therapeutic and physiological benefits of this method of treatment.

2-Before starting the treatment, all measurements of each patient were taken for a comparison.

3-Each patient was placed into comfortable position that allowed the vision of the affected area.

4-All measurements of each patient were taken for before, after 6 weeks, and at the end of treatment.

Group (A) (n=15) received Kinesio taping (KT), Bandage and Manual Lymphatic Drainage (MLD) in the following steps:

1-The affected limb was per skin and the therapist applied very soft pressure with hand motions on the skin and subcutaneous tissue of the patient. Applied pressure was from distal to proximal for 50 min.

2-KT Application (Last session every week.)

3-Skin Preparation: Free of oils, lotions, perspiration, and hair

Positioning strategy

4-Fan cut application

5-Rub application to maximally adhere

6-On the fifth day of each week, a lateral anterior upper limb taping application was used. The fan tape anchor started at the anterior aspect of the hand with no tension. The tails of the tape were applied to the anterior, medial and posterior aspects of the forearm and arm with 5-15% tension (Symkla, 2013), and then on the anterior part of the chest. The tapes were left on the patient's skin for the next three days.

1-Tape Removal and easiest if tape is moistened.

2-Best to remove from top down (direction of body hair.)

3-Lift tape from skin, applying tension between skin and tape.

4-Push skin away from tape rather than pulling the tape away from the skin.

5-Application of mineral oil may assist in removal if tape remains strongly adhered.

6-Multilayered low-stretch compression bandaging is applied at the end of each session. Bandages were wrapped from the fingertips to the axilla in layers to create high pressure gradient at the most distal part of the limb that gradually decreases proximally.

Group (B) (n=15) received Pneumatic Compression Pump (PCP), Bandage and Manual Lymphatic Drainage (MLD) in the following steps:

The affected limb was per skin and the therapist applied very soft pressure with hand motions on the skin and subcutaneous tissue of the patient. Applied pressure was from distal to proximal for 50 min.

1-The fifteen patients received 30 minutes PCP. The affected limb was per skin and was entered in specific sleeve, the device was switched on, then time (30 min), pressure (the lowest pressure program 1), and mode (sequential) were detected then the start button was switched on. After the end of the session the device was switched off.

2-Multilayered low-stretch compression bandaging is applied at the end of each session. Bandages were wrapped from the fingertips to the axilla in layers to create high pressure gradient at the most distal part of the limb that gradually decreases proximally.

Edema assessment

By Using (Tap Measurement), the researchers made group comparisons at the initial visit and after 8 weeks of treatment at olecranon level, 5 Cm above olecranon and 5 Cm below the same reference point for both Groups.

Data Analysis

1. Statistical analyses were performed using SPSS 24.0.

2. One Sample t- test was performed to compare between baseline initial edema assessment and after 8 weeks treatment of each group.

Independent sample t –test was performed to compare between experimental and control group. P-value<0.05 was considered statistically significant. Differences with P values ≤ .05 were considered also statistically significant. Continuous variables were summarized as means and standard deviations.

RESULTS

As shown in table 1 the characteristics of 30 Participants with secondary lymphedema post total mastectomies who participated in this study. Age is expressed as Average ± Standard Deviation (SD) with the range in parenthesis; there were no statistically significant differences between the treatment groups in regard to age.

Table (1) Baseline characteristics of the sample

Characteristics	Results
Age	45.3± 4.3 (39-54)
Gender	F= 30
Unilateral or Bilateral	Unilateral = 30

In Group (A): who received Kinesio Taping (KT), Manual Lymphatic Drainage (MLD) and Bandage statistically significant improvements in edema at all measurement levels was observed compared to baseline scores (P < .05). In Group (B): who received Pneumatic Compression Pump (PCP), Manual Lymphatic Drainage (MLD) and Bandage also statistically significant improvements in edema at all measurement levels were improved (P < .05).By performing Independent sample t –test to compare between experimental group (Group A) and control one (Group B) , P value above olecranon level= 0.29 and below olecranon level , P value = o.36 So, there were no statistical difference between both groups.

DISCUSSION

Managing lymphedema was a challenge as they could not afford the necessary treatment and the self-care items, in addition treatment failure resulted in them feeling exploited and using various treatment options (Johanna and Dalene, 2016)**.**In the current study, the researchers compare two different methods of treatment to select the best one that can achieve real improvement to post mastectomy lymphedema cases.

Many researches supported applying the Kinesio-tape as a part of decongestive lymphatic therapy in case study of mastectomy for female patient. Four years later following mastectomy, the patient started suffering from upper limb lymphedema, located mostly in the arm and forearm. The woman started a 3-week individual physical therapy program in Lymph including 12 sessions of intermittent pneumatic compression and 12 sessions of manual lymphatic drainage and 3 applications of KT. From the first to the fourth day of each week, the patient was subjected pneumatic and manual drainages, and from the fifth to the seventh day the woman was under the action of KT dynamic method. KT improves flow of blood and lymphatic fluid (Jakup et al., 2014).

Another study presented the clinical study. The experimental group consisted of 25 women aged 40 to 70 years treated because of breast cancer with lymphedema. All patients received K-tapes during 20 days of therapy. Assessment of the efficacy of an upper limb in women after mastectomy showed oedema reduction of 24%, increased range of motion of 20% and normalization of muscular tension (Lipinska et al., 2007 **)**.

Other study compared the effect of pneumatic compression pump and low-level laser in the treatment of post mastectomy lymphedema. Forty-seven patients with post mastectomy lymphedema were included in the study. Patients were randomly divided into two groups. Group I (n=24) received pneumatic compression for 2 hours per session and group II (n=23) received low-level laser for 20 minutes per session. All patients were advised to perform daily limb exercises. Demographic features, difference between sum of the circumferences of affected and unaffected limbs (△C), pain with visual analogue scale and grip strength were recorded. △C decreased in both groups. Improvement of group II was greater than that of group I .No significant difference was detected in pain scores between the two groups. Grip strength was improved in both groups. The study concluded that both pneumatic compression pump and low level laser have effect on post mastectomy lymphedema (Kozanoglu et al., 2009).

Some researches opposed the KT method of treatment; they applied pilot study on three groups to assess effect of kinesio tape on breast cancer related lymphedema. The first group (KT group) received kinesio tape. The second group (blacepo group) used tape without therapeutic effects using common surgical stuck with the same methodology as KT group. The third group (bandage group) used 4-layered compression bandage. All groups received 1hour manual lymphatic drainage, 45 min pneumatic compression therapy and skin care. The study observed that the most significant decrease of edema was in the group of multilayered compression bandaging. Results in KT group were similar to those in placebo group and the KT appeared to be ineffective at secondary lymphedema after breast cancer treatment (Symkla et al., 2013).

Other study applied a systematic review and meta-analysis of randomized controlled trials on Intermittent Pneumatic Compression Pump for Breast Cancer-Related Lymphedema The objective of this study was to determine whether the use of an intermittent pneumatic pump (IPC)

could manage lymphedema effectively. The study searched PubMed, EMBASE, and the Cochrane Library for related trials to compare the percent of volume reduction and subjective symptoms. Seven randomized controlled trials, with 287 patients, were included in the study. Results showed that the use of the IPC could alleviate lymphedema, but no significant difference between routine management of lymphedema with or without pneumatic pump existed. The study included that no effectiveness for the addition of an IPC to the routine management of lymphedema (Shao et al., 2014).

In the Present study, the researchers offering two methods of treatment in two different groups, the first received Kineso-Taping, Bandage and MLD and the second received Pneumatic Compression, Bandage and MLD, by applying analysis of differences in each group before and after treatment, the results proved that there was statistically significant improvements in edema at all measurement levels was observed compared to baseline scores in both groups. On the other hand they performing comparison between two groups to detect the best program that can improve post mastectomy, the results proved that there was no statistical difference between both groups.

So the researchers recommended applying combination therapy between Kineso-taping (KT) and Pneumatic Compression Pump (PCP) in treatment of post mastectomy lymphedema.

CONCLUSION

Both Kineso-taping (KT) and Pneumatic Compression Pump (PCP) has a positive effect in reducing post mastectomy lymphedema but there was no significant difference between Kineso-taping and Pneumatic Compression Pump on treatment of Post Mastectomy Lymphedema, So Combination therapy is recommended to achieve better improvement.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

ACKNOWLEGEMENT

Special and warm thanks to all patients that participated in the study for providing us the essential power and patience for completing this work.

AUTHOR CONTRIBUTIONS

All authors contributed in collecting and analyzing data. All authors participated in writing every part of this study. All authors read and approved the final version.

REFERENCES

Ashforth, E. A. Maus, F. J. Schingale, A. (2015). protocol for pneumatic compression home use, Abstract, World Congress of Lymphology, San Francisco USA.

Bąk-Sosnowska M, Oleszko K, Skrzypulec-Plinta V. (2013).Psychological adaptation of mature women in the first days after mastectomy. Menopase Rev. 2013;2: 120–124.

Jakub. T., Tomasz, H. Małgorzata Z., Joanna R., Małgorzata P., Daria C., Magdalena P., Krystyna K. and Violetta S.(2014). Evaluation of the effectiveness of kinesio taping application in a patient with secondary lymphedema in breast cancer: a case report. *PMC Journal.*

Johanna, E. and Dalene, B.(2016). “Just live with it”: Having to live with breast cancer related lymphedema, health s a ge sondheid 2 1 (2 0 1 6) 7 7 e8 5

Kase K, Wallis J, Kase T. (2008). Clinical therapeutic applications of the Kinesio taping methods. Tokyo: Kinesio Taping Association.

Kasawara KT1, Mapa JMR2, Ferreira V2, Added MAN3,4, Shiwa SR4, Carvas N Jr2,5, Batista PA2 (2018). Effects of Kinesio Taping on breast cancer-related lymphedema: A meta-analysis in clinical trials. Physiother Theory Pract. 2018 May;34(5):337-345. doi: 10.1080/09593985.2017.1419522. Epub 2018 Jan 8.

Kozanoglu E, Basaran S, Paydas S, Sarpel T.(2009). Efficacy of pneumatic compression and low-level laser therapy in the treatment of postmastectomy lymphoedema: a randomized controlled trial. Clinical Rehabilitation Journal.

Lipińska A, Śliwiński Z, Kiebzak W, et al..(2007)

The influence of kinesiotaping applocations on lymphoedema of an upper limb In women after mastectomy. Pol J Physiother.;3:258–269.

Muluk SL and Taffe E. A Review of Pneumatic Compression OPEN ACCESS Therapy in the Treatment of Lymphedema. SM Vasc Med. 2016; 1(1): 1003.

Maul SM, Devine JA, Wincer CR. (2009). Development of a framework for pneumatic device selection for lymphedema treatment. Med Devices (Auckl). 2009; 2: 57-65.

Shao Y, Qi K, Zhou Q-H, Zhong D-S .(2014). Intermittent Pneumatic Compression Pump for Breast Cancer-Related Lymphedema: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Oncology Research and treatment Journal.;37:170-174.

Smykla, A, Walewicz, K., Trybulski, R., Halski, T., Kucharzewski ,M., Kucio ,C., Mikusek ,W., Klakla, K. and Taradaj,J.(2013). Effect of Kinesiology Taping on breast cancer-related lymphedema: a randomized single-blind controlled pilot study. Send to Biomed Res Int. 2013;2013:767106. doi: 10.1155/2013/767106. Epub 2013 Nov 27.

Towers A, Hodgson P, Shay C, Keeley V. Care of palliative patients with cancer-related lymphoedema. Clin Pract Develop. 2010;10:72–80