EFFICACY OF COMBINED VODDER MANUAL LYMPHATIC DRAINAGE AND KINESIO TAPING ON CELLULITE POST THIGH LIPOSUCTION

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ABSTRACT

Introduction: The present study was to assess the efficacy of combined of Vodder manual lymphatic drainage and Kinesio Taping on cellulite post liposuction. Methods: Forty-five female patients with severe cellulite (according to Cellulite Severity Scale) post liposuction are divided into 3 groups. Group (A) received Vodder Manual Lymphatic Drainage (MLD), Group (B) received Kinesio Taping (KT) and Group (C) received combined Vodder Manual Lymphatic Drainage and Kinesio Taping, the duration of the interventions was 8 weeks per participant, and each participant received 2 sessions per week. Results: By performing pretest-posttest ANCOVA to compare the cellulite level before and after treatment for the three groups. P value <0.05 so, there was a statistical difference between groups. To detect the group which causes the difference, the researcher performed Tukey HSD test to test for the multiple comparisons between each pair of groups. Group C was detected that it causes the difference. Conclusions: The current study revealed that there was a significant improvement in group (C) more than (A) and (B), So Combination therapy between Kinesio-taping and Vodder Manual Lymphatic Treatment is recommended to achieve better improvement.

Keywords: Cellulite, Manaul Lymphatic Drainage, Post thigh liposuction, Kinesio taping.

I-INTRODUCTION

Liposuction was initially described for evacuation of localized areas of adiposity which, in most cases, should not exceed 1.5 liters of aspirate for the fear of excessive blood loss (1). Currently, the most popular techniques of liposuction include tumescent suction-assisted liposuction (SAL) with or without power assistance, laser-assisted liposuction (LAL), and ultrasound-assisted liposuction (UAL) (2).

Although liposuction is an excellent method for improving body contour, it causes increasing in skin irregularities. Therefore, conventional liposuction is not yet a standard treatment for cellulite (3). It was supported that skin retraction increases in the region after liposuction (4).

Cellulite is a descriptive term used to characterize the cosmetically dimpled topography of skin located most commonly on the outer thighs, posterior thighs, and buttocks. It has been referred to by several synonyms, including gynoid lipodystrophy, nodular liposclerosis, edematofibrosclerotic panniculopathy, panniculosis, adiposis edematosa, dermopanniculosis deformans and status protrusus cutis. Cellulite is multifactorial, alterations in the vascular and lymphatic microcirculation of subcutaneous adipose tissue have been purported to play major role in cellulite formation (5).

Widespread alteration of the skin’s texture otherwise referred to as lumpy-bumpy appearance, orange peel, cottage cheese, or mattress aspect, is the most frequent type of lesion from cellulite. The skin texture is irregular,
uneven and no longer smooth. It has pitting and eversions that are difficult to define and of minimal size (6).

MLD is a specific hands-on remedy that is well tolerated and harmless even to patients with cardiac disease and advanced edema. It serves to enhance filling of the cutaneous primary lymphatics and augments dilation and contractility of the lymphatic conduits. It is also believed to facilitate the recruitment of watershed pathways for lymph flow through its attempts to stimulate the edema-free zones of the trunk and uninvolved extremities or even the development of accessory lymph collectors. MLD initiated from unaffected quadrants of the trunk (the neck, chest, abdomen) and after preparation of these regions, the affected areas of the trunk were treated. Finally, MLD was applied to the edematous limb starting proximally then moving in segments progressively down the limb. The techniques were performed with slower maneuvers (7).

The efficacy of lymphatic drainage in improving cellulite occurs by accelerating removal of interstitial and lymphatic fluid that is decreasing the appearance of cellulite (3). Manual mechanical stimulation of the skin is further supposed to stimulate microcirculation as well as lymphatic drainage to improve lymphedema, which may further improve the appearance of cellulite (8).

The Kinesio taping (KT) is a resource consisting of an elastic bandage, placed on the skin and represent a form of intervention in the removal of accumulated fluid, there are two basic theories explaining reduction of edema, based on the use of the KT. The first is based on the sum of small pressures generated by the application of the banding in the direction of blood flow, favoring lymphatic return; and the second is the stimulation of skin receptors by application directly to the skin of the KT (tactile stimulation) which generates a response to increased interstitial space, facilitating blood flow and reducing the swelling (9).

The first standardized and objective method of grading cellulite is the cellulite severity scale (CSS). This validated photonumeric CSS is based on 5 key morphologic aspects of cellulite, including the 1) number of depressions; 2) depth of depressions; 3) clinical morphology; 4) extent of skin laxity, flaccidity, or sagging; and 5) Nürnberger–Müller classification grade. Each variable is graded from 0 to 3, leading to overall grades of mild (1–5), moderate (6–10), and severe (11–15) (5,10).

The cellulite severity scale has excellent reliability and internal consistency when used to evaluate cellulite of the buttocks and posterior thighs. However, the study showed that laxity scoring is not essential, actually reducing the high internal consistency scores of the scale (11).

II- MATERIALS & METHODS

Design

The present study was a randomized control trial with participants randomly assigned to one of three treatment groups: Group (A) received Manual Lymphatic Drainage. Group (B) received Kinesio Taping (KT). Group (C) received Combined Kinesio Taping and Manual Lymphatic Drainage. the researchers made group comparisons at the initial visit and after 8 weeks. The duration of the interventions was 8 weeks for each participant, and each participant received 2 sessions per week.

Participants

The current study was performed on Participants with cellulite post liposuction that were treated in Surgery Clinic. Forty-five 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 38 years. Patients with skin diseases were excluded from the study.

Material and Measurement Tools

Vodder Manual Lymphatic Drainage (MLD)

Manual Lymphatic drainage is applied by using Vodder technique. The therapist applied very soft pressure by hand motions on the skin and the subcutaneous tissue of the patient in the form of stationary circles, pumps and strokes. The applied pressure was divided between the lymph nodes, anastomosis, abdominal and the affected limb for 40 min. The proximal part of the limb is continually cleared first, after that the drainage is extended peripherally and the carried-out pressure became for every area from distal to proximal.

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The therapist will employ his hands to move the skin within the heading of lymphatic flow, either by pushing or stretching the skin. Physical specialists utilize light pressure without causing redness. After the pressure stage, the therapist begins a relaxation stage. Amid this stage, the therapist keeps up manual contact with the skin but does not apply any pressure. The Vodder strategy utilizes four essential strokes: stationary circles, pumps, rotary, and scoop in different designs (12).

Kinesio Tape

Recently Kinesio taping (KT) is used for improvement of lymphatic drainage. Kinesio Tape is composed of 100% cotton fibers and acrylic heat sensitive. had been designed to allow 30-40% longitudinal stretch. Dr Kenso Kase is the first one who introduce the material and the concept of the taping technique (13).

Some studies recommend the use of Kinesio Tape (KT) to reduce oedema, with-out tension applied, by directing the banding towards the lymphatic return (14).

ABN Kinesio Tap: 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 were randomly assigned into 3 groups, after initial evaluation participants began the treatment on the same day. Participants received 2 sessions per week for 8 weeks.

Group (A) (n=15): received Vodder Manual lymphatic Drainage in the following steps:

The therapist used Vodder Manual lymphatic Drainage. The therapist applied very soft pressure with hand motions on the skin and subcutaneous tissue of the patient. Starting with non-affected quadrant then affected quadrant then affected limb with the proximal area drainage firstly and hand motion from distal to proximal.

Group (B) (n=15): received kinesio Tape in the following steps:

❖ KT Application is applied in form of fan technique application every 3 days for 8 weeks, each time before applying Kinesio-tape the area was cleaned using cotton and alcohol. The fan procedure is commonly used in lymph edema management or for superficial contusions (15).
  - Skin Preparation: Free of oils, lotions, perspiration, and hair, skin was cleaned by cotton and alcohol
  - Positioning strategy
  - Fan cut application
  - Rub application to maximally adhere
  - Posterior thigh taping application was used. Kinesio tape was applied at the site of present cellulite, along the posterior surface of the thigh The bands were cut into four different parts, being placed with minimal tension (0-15%). medial and lateral anchoring of tapes were just below the gluteal fold with the bands stretched from the hip joint to the knee. After 3 days and at the beginning of the next session , the old Kinesio Tape is removed from top down (direction of body hair) , skin is cleaned and the new kinesio tape is applied for other 3 days until the next session.

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

❖ The therapist used Vodder manual lymphatic drainage. The therapist applied very soft pressure with hand motions on the skin and subcutaneous tissue of the patient. Starting with non-affected quadrant then affected quadrant then affected limb with proximal area drainage first and hand motion from distal to proximal
  ❖ KT Application (at the end of each session) in the following steps:

In form of fan technique application at the end of each session for 8 weeks, each time before applying Kinesio-tape the area was cleaned using cotton and alcohol. The fan procedure is commonly used in lymph edema management or for superficial contusions (15).

- Skin Preparation: Free of oils, lotions, perspiration, and hair, skin was cleaned by cotton and alcohol
- Positioning strategy
- Fan cut application
- Rub application to maximally adhere
- At the end of each session, the Posterior thigh taping application was used. Kinesio tape was applied at the site of present cellulite, along the posterior surface of the thigh. The bands were cut into four different parts, being placed with minimal tension (0-15%). Medial and lateral anchoring of tapes were just below the gluteal fold with the bands stretched from the hip joint to the knee. At the beginning of the next session, the old Kinesio Tape is removed from top down (direction of body hair), skin is cleaned and the new kinesio tape is applied until the next session.

**Cellulite assessment**

By Using Cellulite Severity Scale (CSS), the researchers made group comparisons at the initial visit and after 8 weeks of treatment for three groups.

The first standardized and objective method of grading cellulite is the cellulite severity scale (CSS). This validated photonumeric CSS is based on 5 key morphologic aspects of cellulite, including the 1) number of depressions; 2) depth of depressions; 3) clinical morphology; 4) extent of skin laxity, flaccidity, or sagging; and 5) Nürnberg–Müller classification grade. Each variable is graded from 0 to 3, leading to overall grades of mild (1–5), moderate (6–10), and severe (11–15) (5,10).

**Classification scale by NÜRNBERGER and MÜLLER**

This item is based on the classification of cellulite by NÜRNBERGER and MÜLLER. Patients should be evaluated in the standing position with relaxed gluteus muscles. However, if the patient has no evident depressions, the pinch test should be applied (by pinching the skin between the thumb and index finger) in order to differentiate between scores.

**Grade (zero):** There is no alteration of the skin surface.

**Grade (I):** The skin of the affected area is smooth while the subject is standing or lying, but the alterations to the skin surface can be seen by pinching the skin or with muscle contraction.

**Grade (II):** The orange skin or mattress appearance is evident when standing, without the use of any manipulation (skin pinching or muscle contraction).

**Grade (III):** The alterations described in grade or stage II, are present together with raised areas and nodules. The new classification of cellulite as mild, moderate, and severe is determined by the severity scores obtained for sections A to E (16,17).

**Data Analysis**

- Statistical analysis was performed using SPSS 24.0
- Descriptive analysis mean ages and standard deviation was made using simple statistics.
- ANOVA test was performed for three groups pre-treatment.
- Pretest-post test data analysis with ANCOVA in SPSS was performed.
- Tukey HSD test to test for the multiple comparisons between each pair of groups and detect which group that cause the difference.

**III- RESULTS**

Forty-five female Participants with sever cellulite (according to Cellulite Severity Scale) post liposuction are divided randomly into 3 groups and received 2 sessions per week for 8 weeks. All statistical analysis was conducted through the statistical package for social studies (SPSS) version 24 for windows (IBM SPSS, Chicago, IL, USA).

**Group A:** Fifteen patients included in this group, were received MLD for 40 minutes, two sessions per week for 8 weeks. The data in table represented their mean ages and standard deviation 37.9±2.7 years.
Group B: Fifteen patients included in this group, were received KT application that is changed every 3 days (two Applications per week through 2 sessions) for 8 weeks. The data in table represented their mean ages and standard deviation 37.9±3. years.

Group C: Fifteen patients included in this group, were received Manual Lymphatic Drainage (MLD) for 40 minutes two sessions per week with application of (Kinesio Tape) KT at the end of each session for 8 weeks. The data in table represented their mean ages standard deviation 38.3±2.9 years. There was no significant difference in age between groups (p > 0.05).

By performing one way ANOVA test for three groups pre-treatment. There was no significant difference between groups pre-treatment p value=0.4, (p > 0.05). Also, there was no significant difference in cellulite level at participant thigh.

Pretest-post test data analysis with ANCOVA in SPSS was performed. There was a significant difference between three groups p value <0.05.

ANOVA test was performed for 3 groups post treatment and proved that there was a significant difference between three groups, to detect the group which causes the difference, the researcher performed Tukey HSD test to test for the multiple comparisons between each pair of groups. Group C was detected that it causes the difference. The current study revealed that there was a significant improvement in group (C) more than (A) and (B) as shown in figure 1.

IV- DISCUSSION

Cellulite is one of the most common skin and subcutaneous tissue conditions, affecting predominantly the thighs and hips in post adolescent women. Its etiology is not well defined, and multiple available treatments show variable efficacy (18). It has been proven that liposuction causes increasing in skin irregularities and conventional liposuction is not yet a standard treatment for cellulite (3).

More recently, functional elastic bandages have been used in the treatment of circulatory, lymphatic and skin changes, such as edema and scarring. The Kinesio Taping (KT) is a technique of applying elastic bandages, which has been used on a large scale. Theoretically, the bandage was developed to adapt optimally to the human skin, generate various benefits which are explained in a general way by stimulation of skin receptors. Although it is a widely used technique at present. Some studies bring good results regarding the use of KT to reduce edema, without tension applied by directing the banding towards the lymphatic return (9).

All manual lymphatic drainage schools are similar in the basic aspects of lymphatic drainage but the techniques are applied and taught in different Schools like Vodder, Casley-Smith and Foldi (19). Vodder MLD Strategy is used to extend the viability of the lymphatic pumps. This is done by using high pressure (a process known
as pressure stage that includes manual pushing) and zero pressure (a process known as relaxation stage that includes manual contact) (12).

This research results showed reduction in the level of cellulite in women of three groups, being higher in the group treated with combined MLD and KT. The patient and both specialists found a considerable improvement in the skin at the site of treatment by combining MLD and KT. The skin seemed better supplied with blood, more elastic, supple and firm, while cellulite seemed less visible than before the procedure.

A study was applied to investigate the effects of Kinesio Taping in patients with cellulite. Twenty-four patients with cellulite in the gluteal region (grades I, II and III) participated in the study. The patients were randomly divided into two subgroups of 12 individuals, a control group (CG) and a treatment group (GKT) who received Kinesio Taping. Both the CG as the GKT were evaluated before and after the experiment, using a specific cellulite assessment protocol and photogrammetry. There was a significant reduction of cellulite grade in the GKT. In photogrammetric analysis, there was a significant clinical improvement in GKT. The study concluded that treatment with KT was able to make significant improvement in cellulite treatment (9).

Another study proposed a novel application of kinesiology taping in the reduction of cellulite. Thirty-two female patients with first-degree cellulite on the thighs are participated in the study. The tapes were applied on the lateral surfaces of the right thigh, stretching from the hip joint towards the knee, and were kept in this location for 72 hours. After removal of the tapes, both the patient, and the treating cosmetologist and physiotherapist assessed the skin condition in the treated area as clearly improved. The study concluded that the use of adhesive elastic therapeutic tape seems a promising method for reducing cellulite (20).

Also, a study was applied to assess the efficacy of Kinesiology Taping (KT) for lymphatic improvement. Thirty-five women with unilateral stage II and III lymphedema were randomly grouped into the KT group (K-tape), the Quasi KT group (Quasi K-tapes), or the MCT group (multilayered compression therapy group). Skin care, 45 min pneumatic compression therapy, 1 h manual lymphatic drainage, and application of K-tape/Quasi K-tapes/multilayered short-stretch bandages were given every treatment session, 3 times per week for 1 month. Comparing the changes in K-tapes with Quasi K-tapes changes, there were no significant differences. The study concluded that The KT appeared to be ineffective and at this moment it must not be an alternative choice for lymphatic improvement (21).

Another study was applied to analyze the effect of MDL in the treatment of cellulite. The study conducted an evaluation at the beginning and end of treatment in 10 women with cellulite grade I to III. Photographic records were made of the buttocks and upper thighs. The therapy consisted of 10 sessions of Vodder MLD lasting 60 minutes. There was found clinical improvement in skin appearance. All patients reported being satisfied with treatment. The study concluded that MLD proved to be an adjuvant therapy in the cellulite treatment, with improved self-esteem and satisfaction of patients (22).

Another study was applied to evaluate perimetric reductions in the clinical treatment of cellulite through manual lymphatic drainage, mechanical lymph drainage and cervical stimulation for one hour per day over 10 days. The medical records of 150 patients treated for cellulite were revisited. Treatment comprised manual lymphatic drainage, mechanical lymph drainage and cervical stimulation for one hour per day over 10 days. The authors believed that the cause of cellulite is changes in the lymphatic system and the production of substances within the interstitial space with the consequence the regional cutaneous lymphostasis. Results showed significant reduction in size was seen with treatment of cellulite giving an improvement in the physical appearance (23).

Another study compared the effectiveness of manual lymphatic drainage with or without the use of functional bandages in cellulite in pregnant women in the second and third trimester. This was a randomized clinical trial, composed of three groups: G1: Manual Lymphatic Drainage (MLD); G2: MLD and Functional Bandage (FB); G3: Control Group. Inclusion criteria included pregnant women in the second and third trimester, primiparous or multiparous and a single fetus pregnancy. MLD was performed in the gluteal region and lower limbs, and FB was applied from the inguinal region in the form of a web directed to the medial gluteal region. There was a significant improvement Statistically and clinical improvement in groups G1 and G2, when compared to G3. The study included clinical improvement in Cellulite with MLD alone, and in association with FB (24).

Another study investigated the efficacy and safety of manual lymphatic drainage for cellulite management. The study included 20 women aged from 20 to 40 years. Fourteen sessions of manual lymphatic drainage were

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performed once a week on lower limbs and buttocks. A significant improvement on quality of life was observed (p=0.018). A significant reduction (p=0.023), estimated at 0.3±0.8 cm, in hip circumference was found, but no difference was found in thighs circumference (p>0.05). A significant reduction elastic recuperation of skin on buttocks, which means skin elasticity worsening, was observed. The study concluded that manual lymphatic drainage was safe but not effective as an isolated approach for cellulite management (25).

So, the researchers recommended applying combined Vodder Manual Lymphatic Drainage (MLD) and Kinesio Taping (KT) in the treatment of cellulite post liposuction.

V- CONCLUSION
Combination of Vodder Manual Lymphatic Drainage and Kinesio Taping has a positive effect in reducing cellulite post liposuction. So Combination therapy is recommended to achieve better improvement.

REFERENCES

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