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Impact of Manual Lymphatic Drainage Vs. Kinesiology Taping on Lymphedema Management Post-Mastectomy: An Experimental Study

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Abstract

Background: Lymphedema is a common complication following mastectomy, often causing swelling, pain, and decreased quality of life. Effective management is essential, with Manual Lymphatic Drainage (MLD) and Kinesiology Taping (KT) being two popular non-invasive treatment options. MLD is a gentle massage technique that stimulates lymph flow to reduce swelling, while KT involves applying elastic tape to promote lymphatic drainage and circulation. Though both therapies have shown promise in alleviating lymphedema symptoms, there is limited research comparing their effectiveness in post-mastectomy patients. This study aims to evaluate and compare the impact of MLD and KT on lymphedema management, focusing on reducing swelling and improving patient outcomes.

Method: This comparative experimental study included 60 female participants with post-mastectomy lymphedema. Group A underwent MLD thrice weekly, and Group B received KT twice weekly for 12 weeks. Outcomes included limb circumference reduction, Lymphedema Life Impact Scale (LLIS) scores, and patient satisfaction.

Results: Both interventions reduced limb volume and improved quality of life significantly. MLD demonstrated superior limb circumference reduction (23.4% vs. 18.1%, $p<0.05$). KT scored higher on patient satisfaction due to convenience.

Conclusion: MLD is more effective in reducing limb volume, while KT offers a convenient alternative with comparable quality-of-life improvements. Individualized approaches are recommended.

Keywords: Manual Lymphatic Drainage, Kinesiology Taping, Lymphedema, Post-Mastectomy, Physiotherapy

Introduction

Lymphedema, characterized by the accumulation of protein-rich fluid in the interstitial spaces, is a common and debilitating complication following mastectomy. It results from damage or removal of lymph nodes during surgical interventions, leading to impaired lymphatic drainage. This condition often

manifests as swelling, discomfort, and a feeling of heaviness in the affected limb, significantly impacting patients' physical, psychological, and social well-being. Beyond its physical symptoms, lymphedema can lead to emotional distress, reduced self-esteem, and social isolation, thereby diminishing overall quality of life[1,9].

Effective management of lymphedema is crucial to mitigate these challenges and enhance patient outcomes. Various therapeutic interventions have been developed, with Manual Lymphatic Drainage (MLD) and Kinesiology Taping (KT) being among the most widely used. MLD involves gentle, rhythmic massage techniques designed to stimulate lymphatic flow, reduce fluid accumulation, and alleviate associated symptoms[3-4]. On the other hand, KT, a relatively newer approach, employs elastic therapeutic tape applied to the skin to promote lymphatic drainage by mechanically lifting the skin and facilitating improved circulation[4,5,6].

Despite their widespread application, there remains a lack of robust comparative evidence on the efficacy of these interventions, particularly in post-mastectomy lymphedema management. This knowledge gap highlights the need for research to evaluate and compare the outcomes of MLD and KT systematically[4]. Understanding the strengths and limitations of these techniques can guide clinicians in tailoring interventions to individual patient needs, ultimately improving the quality of care for individuals living with lymphedema[5].

The rising prevalence of lymphedema among post-mastectomy patients underscores the importance of identifying effective management strategies. Comparing MLD and KT can provide evidence-based guidance for clinicians, helping to tailor interventions to individual needs and improve patient outcomes[8-9].

Aim and Objective

Aim: To compare the effectiveness of Manual Lymphatic Drainage (MLD) and Kinesiology Taping (KT) in managing post-mastectomy lymphedema.

Objectives:

1. To evaluate the impact of MLD and KT on limb circumference reduction.
2. To assess improvements in quality of life using the Lymphedema Life Impact Scale (LLIS).
3. To analyze patient satisfaction with both interventions.

Hypothesis

Null Hypothesis: There is no significant difference between MLD and KT in managing post-mastectomy lymphedema.

Alternative Hypothesis: MLD and KT differ significantly in their effectiveness for managing post-mastectomy lymphedema.

Methodology

Study Setting: The study was conducted in CIMS Bhopal Physiotherapy center equipped with dedicated facilities for lymphedema management. All procedures were supervised by certified physiotherapists with experience in MLD and KT application.

Study Population: The target population consisted of female patients aged 30 to 65 years diagnosed with unilateral upper limb lymphedema following mastectomy. Participants were screened for eligibility

based on inclusion and exclusion criteria.

Randomization and Allocation: Participants were randomly assigned to one of two intervention groups using a computer-generated randomization table. Allocation was concealed using sealed envelopes to minimize bias.

Intervention Details:

1. **Group A (MLD):** Received Manual Lymphatic Drainage therapy thrice weekly for 12 weeks. Each session lasted approximately 45 minutes and followed standardized protocols, including distal to proximal massage strokes to enhance lymphatic flow.
2. **Group B (KT):** Underwent Kinesiology Taping application twice weekly for 12 weeks. The tape was applied with 10% tension in a fan-shaped pattern over the affected limb, targeting regions with visible swelling. Participants were instructed to keep the tape on for 3-5 days per application.

Monitoring and Compliance: All participants attended scheduled sessions at the physiotherapy center, ensuring consistent intervention delivery. Compliance was monitored through session attendance records and self-reported adherence to instructions.

Primary and Secondary Outcomes:

- **Primary Outcomes:** Changes in limb circumference measured at three standardized anatomical landmarks.
- **Secondary Outcomes:** Improvements in Lymphedema Life Impact Scale (LLIS) scores and patient-reported satisfaction using a 5-point Likert scale.

Follow-Up and Data Collection: Baseline measurements were taken prior to the intervention, with follow-up assessments conducted at 4-week intervals and at the end of the 12-week period. Data were recorded by blinded assessors to prevent observer bias.

Type of Study

Comparative experimental study.

Study Design

Experimental pre – post control group design

Sample Size

60 female patients aged 30-65 years with unilateral upper limb lymphedema post-mastectomy.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Female patients aged 30-65 years.
- Diagnosed with unilateral upper limb lymphedema post-mastectomy.
- Willing to participate and provide informed consent.

Exclusion Criteria:

- Patients with bilateral lymphedema.
- History of recurrent cancer or active infections.
- Contraindications to MLD or KT.

Outcome Measures

1. Limb circumference reduction measured at three standardized points.
2. Lymphedema Life Impact Scale (LLIS) scores.
3. Patient satisfaction assessed via a 5-point Likert scale.

Variables

Independent Variables: MLD and KT interventions.

Dependent Variables: Limb circumference, LLIS scores, and patient satisfaction.

Data Analysis & Result

Data were analyzed using SPSS version 25. Statistical analyses were carried out to compare the effectiveness of the interventions. Paired t-tests were used to assess within-group changes in outcomes, while ANOVA was applied to evaluate between-group differences. For categorical variables like patient satisfaction, chi-square tests were employed. A p-value of <0.05 was considered statistically significant for all analyses. Descriptive statistics, including mean and standard deviation, were used to summarize the data.

The results are summarized in the table below.

Outcome Measure	Group A (MLD)	Group B (KT)	p-value
Limb Circumference Reduction (%)	23.4%	18.1%	<0.05
LLIS Score Improvement	14.5%	13.9%	>0.05
Patient Satisfaction (“Excellent” Rating)	70%	85%	N/A

Discussion

The results of this study provide strong evidence that both Manual Lymphatic Drainage (MLD) and Kinesiology Taping (KT) are effective methods for managing post-mastectomy lymphedema, with each offering unique benefits depending on the patient’s specific needs. MLD demonstrated a greater efficacy in reducing limb circumference, highlighting its effectiveness in achieving significant volume reduction. This makes MLD the preferred treatment for patients seeking noticeable reductions in swelling. The gentle and targeted technique of MLD, which stimulates lymphatic flow, directly addresses the underlying pathophysiology of lymphedema, leading to enhanced lymphatic drainage and decreased edema[10-11].

In contrast, KT, while not as effective in reducing limb size, showed promising results in improving the overall quality of life for patients. KT’s ability to provide continuous support through the application of elastic tape is particularly beneficial in promoting lymphatic circulation and reducing discomfort during daily activities. The convenience of KT, coupled with its non-invasive nature, makes it a viable alternative for patients who may not have consistent access to professional therapists or who prefer a self-management approach. KT’s portability and ease of application enable patients to manage their

condition at home, which could be particularly advantageous in low-resource settings or for those with mobility challenges[12-14].

These findings align with existing literature, which suggests that both MLD and KT have beneficial roles in lymphedema management. Previous studies have highlighted the effectiveness of MLD in reducing swelling and improving lymphatic function, while KT has been associated with improved functional outcomes, such as greater mobility and less discomfort. Importantly, our study emphasizes the need for individualized care strategies that consider patient preferences, access to resources, and the severity of lymphedema when selecting the most appropriate treatment.

Further research is necessary to explore the long-term effects of both interventions, as well as their combined use, to provide a more comprehensive approach to lymphedema care. Future studies with larger sample sizes and extended follow-up periods are recommended to validate these findings and determine the optimal frequency, duration, and combination of MLD and KT in post-mastectomy lymphedema management. Additionally, research into the cost-effectiveness and patient satisfaction with both treatments will be valuable in informing clinical practice and improving patient-centered care.

Conclusion

Both Manual Lymphatic Drainage (MLD) and Kinesiology Taping (KT) have proven to be effective interventions for managing post-mastectomy lymphedema, each offering distinct advantages. MLD emerged as the superior treatment for reducing limb volume, as it directly targets the lymphatic system through gentle, rhythmic massage techniques that enhance lymphatic drainage and decrease swelling. This makes MLD an excellent choice for patients seeking significant reductions in limb circumference, particularly in the early stages of lymphedema or for those with more pronounced swelling. The clear effectiveness of MLD in volume reduction makes it a cornerstone in the management of post-mastectomy lymphedema, providing relief to patients who are experiencing physical discomfort from excessive fluid buildup.

On the other hand, KT demonstrated notable advantages in terms of patient satisfaction, comfort, and convenience. While it may not reduce limb volume to the same extent as MLD, KT offers continuous support throughout the day, helping to alleviate pain, promote circulation, and improve overall functional mobility. The ease of application and portability of KT makes it an attractive option for patients who may not have regular access to healthcare providers or those who prefer a more independent approach to managing their condition. Given its non-invasive nature, KT can be a valuable alternative or adjunct to MLD, particularly for individuals with mild to moderate lymphedema or for those looking for a more convenient, self-management strategy. Ultimately, a tailored, patient-centered approach that considers the severity of lymphedema, personal preferences, and access to healthcare resources is essential for achieving the best possible outcomes. Combining both treatments in a comprehensive care plan could further enhance the effectiveness of lymphedema management post-mastectomy.

Limitation and Future Scope

Limitations:

1. Short duration of the study.
2. Limited sample size.
3. Lack of cost-effectiveness analysis.

Future Scope:

1. Studies with longer follow-up periods.
2. Cost-effectiveness analysis of MLD and KT.
3. Exploration of combined interventions for enhanced efficacy.

Ethical Clearance

This study was approved by the Institutional Ethical Committee of Career College, Bhopal, under reference number CC/BPT/24/351, dated 25/04/2024.

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