

Evaluation of Volume Reduction Using the Kuhnke Method after Instrumental Lymphatic Drainage in Patients with Stage I and II Lymphedema: A Three--Month Study in Moscow

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Abstract

This prospective clinical study assessed the effectiveness of the Kuhnke method in reducing limb volume in patients with Stage I and II lymphedema following instrumental lymphatic drainage therapy. Conducted at the Instrumental Therapy Center of Pirogov Medical University, Moscow, the study involved 54 patients treated under a standardized protocol. Results demonstrated significant limb volume reduction, particularly in Stage I patients, supporting the use of the Kuhnke method as an adjunctive therapy for early-stage lymphedema. Additionally, the study evaluated potential correlations between age, gender, and BMI to further understand the therapy's efficacy.

Keywords: Lymphedema; Kuhnke Method; Instrumental Lymphatic Drainage; Volume Reduction; Rehabilitation

Introduction

Lymphedema is a chronic condition characterized by lymphatic fluid accumulation, leading to persistent limb swelling. Conservative treatment remains the cornerstone for managing early-stage lymphedema. The Kuhnke method, which calculates limb volume using circumference measurements and the truncated cone formula, has shown promise in enhancing therapeutic outcomes when combined with instrumental lymphatic drainage. This study builds on previous research, incorporating the Kuhnke method as an adjunct to therapy and exploring its effectiveness in reducing limb volume in patients with Stage I and II lymphedema.

Previous studies have demonstrated the efficacy of the Kuhnke method in early-stage lymphedema, but few have explored its use in combination with instrumental lymphatic drainage, particularly in a cohort as large as ours. Additionally, the impact of patient variables, such as age, gender, and BMI, on treatment outcomes remains underexplored. This research aims to fill that gap by providing insights into how these factors may influence the success of the Kuhnke method in treating lymphedema.

Methods

Study Design

- A single-center prospective cohort study conducted from May to July 2021 at Pirogov Medical University's Instrumental Therapy Center

Inclusion Criteria

- Diagnosed with Stage I or II lymphedema (ISL criteria)
- Aged 18–65 years
- No surgical or oncological treatment within six months prior

Sample Size

- Total participants: 54 (38 with Stage I; 16 with Stage II)

Intervention

Instrumental lymphatic drainage (30 minutes/session, twice weekly) followed by the Kuhnke method application over 12 weeks.

Volume Assessment

- Limb volume measured using water displacement at baseline, Week 6, and Week 12.

Additionally, a stratified analysis was conducted based on gender, age category, and BMI to assess the impact of these factors on the effectiveness of the therapy.

Results

Lymphedema Stage	Baseline Volume (ml)	Volume at Week 12 (ml)	Average Volume Reduction (%)
Stage I	1850 ± 340	1340 ± 270	27.6%*
Stage II	2430 ± 420	1975 ± 390	18.7%**

- *Significant reductions were observed for both stages (*p < 0.01 for Stage I; **p < 0.05 for Stage II).

Gender, Age, and BMI Subgroup Analysis:

- Age did not significantly affect the volume reduction outcome, although younger patients tended to show slightly greater reductions in limb volume.
- Female patients demonstrated a more pronounced volume reduction compared to male patients, potentially due to differences in tissue composition.
- BMI was inversely correlated with volume reduction, with patients having a lower BMI showing more significant reductions, suggesting that obesity may limit the effectiveness of the treatment.

Discussion

The study confirms that the Kuhnke method significantly enhances volume reduction when combined with instrumental lymphatic drainage, especially in early-stage lymphedema (Stage I). Stage II patients showed a less pronounced volume reduction, likely due to the presence of fibrotic tissue changes that may limit the effectiveness of lymphatic drainage.

A notable finding was the influence of gender, age, and BMI on treatment outcomes. Female patients and those with lower BMI showed better responses to the therapy, suggesting that these factors should be considered when tailoring treatment plans for lymphedema patients. The limitations of this study include a short observation period and the lack of a comparison group using alternative therapeutic methods, which could have provided a clearer understanding of the Kuhnke method's relative effectiveness.

Conclusion

The Kuhnke method is highly effective in reducing limb volume in early-stage lymphedema and should be integrated into rehabilitation protocols for such patients. Future studies with larger cohorts and longer follow-up periods are needed to confirm these findings and explore potential adaptations for patients in later stages of the disease.

Conflict of Interest

None declared

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