

## Introduction

Lymphatic treatments are an Osteopathic Medicine technique that helps mobilize and enhance the normal movement of lymph in the circulatory system. Certain diseases such as edema, lymphedema and venous stasis may gain a benefit from this technique to help clear the excess fluid as well as enhancing the immune system. Preliminary data in healthy subjects showed a significant decrease in lower leg volume using the Osteopathic Lymphatic Pedal Pump. This study was designed to determine if the use of pedal pump technique following the opening of the thoracic inlet with myofascial release technique is able to move volume out of the lower extremities in geriatric patients with chronic edema or lymphedema.

## Methods

Twenty geriatric patients were recruited from the NJISA if they had lower limb edema. Patients were excluded from the study if they had any of the following conditions: acute asthma, COPD, metastatic cancer, active infections, or lower extremity fractures. A within-subjects study design with pre- and post-treatment measurement of lower limb volume was used. Pretreatment lower limb volume measurements were obtained using a volumetric water gauge (Fig. 1) prior to myofascial thoracic inlet release (Fig. 2) and the 5-minute pedal pump protocol treatment (Fig. 3). Posttreatment lower limb volume measurements were then taken immediately following the pedal pump protocol treatment. A telephone interview was conducted 2-3 days later to assess participants' experience of the treatment and whether they would consider receiving the treatment in the future.

## Abstract

The osteopathic pedal pump is a lymphatic technique that is both gentle and passive. Although widely taught in osteopathic medical schools as a method to enhance lymphatic flow, there have been few studies to support this claim until now. We recruited 20 geriatric patients with lower extremity edema from the New Jersey Institute for Successful Aging (NJISA). On those patients we performed the pedal pump treatment protocol describe in the methods. Then, using a two tailed T- test, we determined that the significance of displacement between pre-treatment and post-treatment limb volumes was highly significant with a p- value of  $p = 0.001$  for change in limb volume following the combined thoracic inlet/outlet and five-minute pedal pump treatment. We therefore recommend consideration of the osteopathic pedal pump for treatment of lower extremity edema for patients who are willing.

	t	df	Significance		Mean Difference	95% Confidence Interval of the Difference	
			One-Sided p	Two-Sided p		Lower	Upper
PreTxVolume	30.078	19	<.001	<.001	2994.80000	2786.4014	3203.1986
PostTxVolume	30.717	19	<.001	<.001	2917.90000	2719.0789	3116.7211
Volumedifference	-5.219	19	<.001	<.001	-76.90000	-107.7381	-46.0619

**Table 1** Results of one- and two-sided t-tests on the pre- and post-treatment volume and volume difference



**Figure 1**  
Volumetric Gauge



**Figure 2**  
Demonstration of  
Thoracic Inlet  
Release



**Figure 3**  
Demonstration of  
Lymphatic Pedal Pump

## Results

The average change in lower limb volume of our patients was 76.90 mL with a standard deviation of 65.89 mL. There was statistically significant change ( $p = 0.001$ ) between pre- and post-treatment limb volumes. The minimum displacement was -12 mL and the maximum displacement was -242 mL. In a post hoc analysis, patients who saw the most appreciable change are those who also have diabetes ( $p < .001$ ;  $M = 113.75$  mL;  $SD = 88.399$  mL), history of DVT ( $p = 0.038$ ;  $M = 120.50$  mL;  $SD = 105.5$  mL), or obesity ( $p = .004$ ;  $M = 94.3$  mL;  $SD = 86.82$  mL).

## Conclusions

The osteopathic pedal pump is a potentially highly-efficacious adjunctive treatment in elderly patients with pedal edema. There are some limitations to our study, namely the small sample size and the lack of a control group. Further, larger double blinded controlled clinical trials are needed to support the effect of the treatment in a more generalizable population.

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