

**COMBINED OPTO-ELECTRONIC PEROMETRY AND BIOIMPEDANCE  
TO MEASURE OBJECTIVELY THE EFFECTIVENESS OF A NEW  
TREATMENT INTERVENTION FOR CHRONIC SECONDARY LEG  
LYMPHEDEMA**

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*ABSTRACT*

*Secondary lymphedema of the legs is a common sequela of patients treated for cancer of the reproductive, gastrointestinal, urinary systems and melanoma. From a clinical and research perspective it is of utmost importance to use techniques that objectively quantify leg volume and fluid composition as an indicator of lymphedema severity and response to treatment. Two techniques often used in both the clinical and research setting are leg perometry and multi-frequency bioimpedance. Although both techniques have been extensively validated, this trial aimed to cross correlate both measurement techniques to ascertain whether each or both could be used reliably for measurement of leg lymphedema. These measurements were utilized throughout a clinical trial that assessed the effectiveness of a new home based treatment program in the form of the Sun Ancon Aerobic Exerciser<sup>®</sup>. This machine delivered both elevation and passive exercise to the legs, with participants using the machine over a three week period during which time their leg volumes were measured using both perometry and bioimpedance. The results demonstrated that leg volume measurements decreased using both perometry and bioimpedance. The reduction in body extracellular fluid as measured by bioimpedance correlated well with a reduction in leg volume as measured by perometry. Bioimpedance also recorded a reduction in weight, which was correlated with the reduction in leg volume as measured by perometry. This trial confirms that perometry and bioimpedance were both effective in independently showing a reduction in leg lymphedema using the Aerobic Exerciser therapy, and that both methods can be reliably used to measure and follow leg lymphedema.*