ABSTRACT

Assessing lower extremity limb volume and its change during and after lymphedema therapy is important for determining treatment efficacy and documenting outcomes. Although leg volumes may be determined by tape measure and other methods, there is no metric method to routinely assess foot volumes. Exclusion of foot volumes can under- or overestimate therapeutic progress. Our aim was to develop and test a metric measurement procedure and algorithm for practicing therapists to use to estimate foot volumes. The method uses a caliper and ruler to measure foot dimensions at standardized locations and calculates foot volume ($V_M$) by a mathematical algorithm. $V_M$ was compared to volumes measured by water displacement ($V_W$) in 30 subjects (60 feet) using regression analysis and limits of agreement (LOA). $V_W$ and $V_M$ (mean ± sd) were similar 857±150 ml vs. 859±154 ml, and were highly correlated $V_M = 1.00V_W + 1.67$ ml, $r=0.965$, $p<0.001$. The LOA for absolute volume differences and percentages were respectively ±79.6 ml and ±9.28 %. These results indicate that this metric method can be a useful alternative to water displacement when foot volumes are needed, but the water displacement method is contraindicated, impractical to implement, too time consuming or is not available.