

A Method to Estimate Foot Volume Based on Metric Measurements

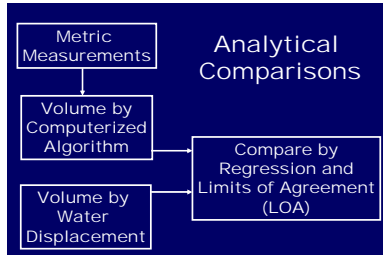
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BACKGROUND-GOALS-APPROACH

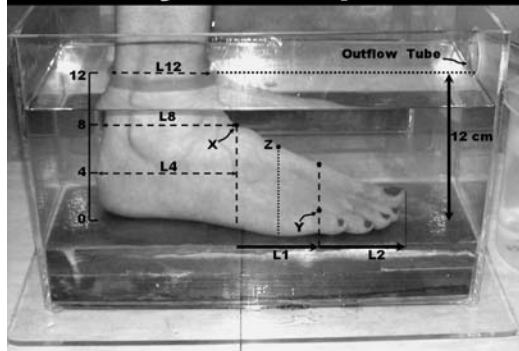
- Assessing lower extremity limb volume and its change during and after lymphedema therapy is important for determining treatment efficacy and documenting outcomes.
- Although leg volumes may be determined by tape measure methods, there is no similar method that can routinely be used in a clinical setting to assess foot volumes.
- Our research goal was to develop and test a simple metric measurement procedure and algorithm that could be used by the practicing therapist to accurately estimate foot volumes.

MEASUREMENT OVERVIEW

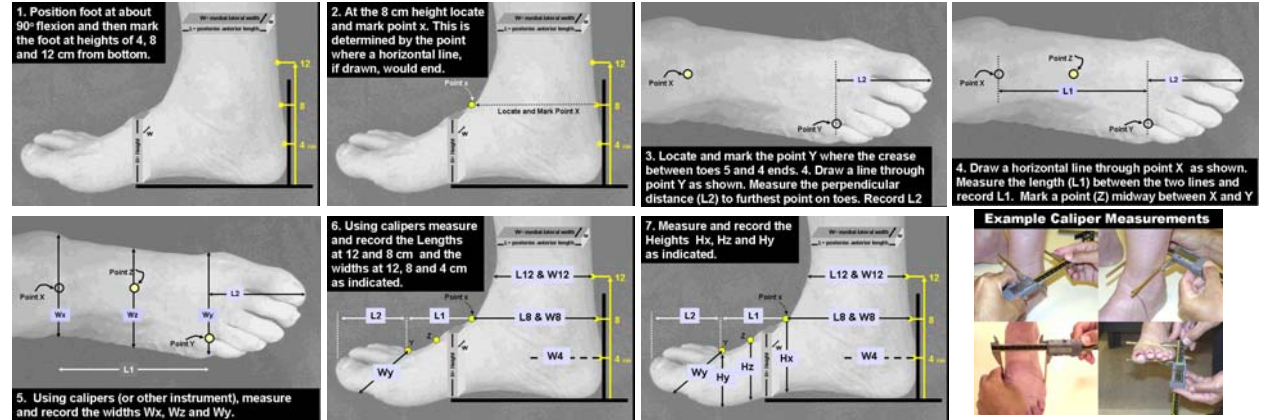
- An algorithm was developed based on foot geometry and measurements of foot dimensions of 60 feet in 30 subjects
- The algorithm's foot volume predictions were compared to foot volumes measured by the "gold standard" water displacement method using regression and limits of agreement (LOA) analyses.



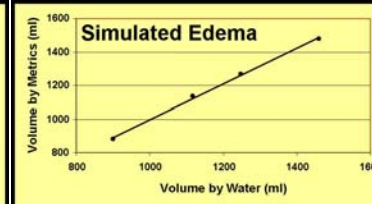
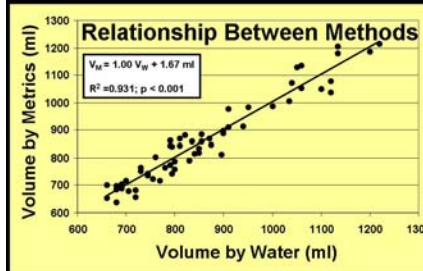
Volume by Water Displacement



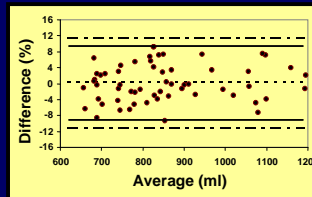
FOOT METRIC MEASUREMENT PROCEDURE



MAIN RESEARCH FINDINGS



Limits of Agreement



	Difference	LOA	95% CI
$V_M - V_W$ (ml)	1.62 ± 39.8	±79.6	+99.1 to -95.8
$(V_M - V_W)/V_W$ (%)	0.21 ± 4.64	±9.28	+11.6 to -11.2

CONCLUSIONS

- Based on the small absolute and percentage differences between volume estimates, we conclude that the metric-based algorithm is suitable for use to assess foot volume changes.
- Since the algorithm is easily implemented**, it provides the therapist with a way to track volumes that is considerably more practical than water displacement procedures.
- Whether the two methods are viewed as fully interchangeable depends on clinical judgment as to an acceptable error based on the LOA between methods.

** www.limbvolumes.org



Dr. Mayrovitz welcomes comments and queries.
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