

14. SWACSM Abstract

Comparison of Whole-Body Phase Angle Assessed by Supine and Vertical Bioelectrical Impedance Analyzers

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ABSTRACT

Several bioelectrical impedance analysis (BIA) analyzers such as the RJL Quantum Legacy and the InBody 770 measure phase angle (PhA, marker of cellular health) in addition to estimating body fat percentage (%BF). These analyzers require the participant to be supine or vertical, respectively, during the assessment and use different electrode configurations, both of which may affect the measurement of PhA and %BF. **PURPOSE:** Investigate the difference and agreement between PhA and %BF assessed by the RJL and InBody analyzers. **METHODS:** Thirty-eight young (18-38 yrs.), hydrated (urine specific gravity ≤ 1.020) adults (16 men; 22 women) stood for 15 minutes to allow for body water compartment stabilization prior to undergoing PhA and %BF assessment by the InBody. Participants then laid in the supine position for 15 minutes prior to having resistance, reactance, and PhA assessed on the right side of their body via the RJL analyzer. Resistance and reactance values were used in prediction equations provided by the RJL's BC4 software to estimate %BF. Paired samples *t*-tests were used to determine differences in PhA and %BF between the two analyzers. Agreement between the analyzers for assessing PhA and %BF was quantified via Bland-Altman 95% limits-of-agreement (LoA) plots. Acceptable LoA for %BF and PhA were determined to be less than $\pm 3.5\%$ and $\pm 1.0^\circ$, respectively. Cohen's *d* was used to represent effect size, where small = .2; medium = .5; large = .8. Statistical significance was set at $\alpha < .05$. **RESULTS:** PhA was significantly greater using the RJL ($7.15 \pm 0.84^\circ$) compared to the InBody ($6.11 \pm 0.74^\circ$), $p \leq .001$; $d = 2.47$. The LoA for bias in PhA between devices (RJL - InBody) was $1.04 \pm .42^\circ$, indicating poor agreement at the individual level. No significant difference was observed for %BF estimated between the RJL ($23.0 \pm 6.8\%$) and the InBody ($23.1 \pm 7.4\%$), $p = .813$; $d = .04$. The LoA for bias in %BF between devices (RJL - InBody) was $-.09 \pm 2.5\%$, indicating good agreement at the individual level. **CONCLUSION:** Both analyzers estimated %BF similarly, suggesting they are interchangeable for this purpose. An individual's PhA may be misclassified if measured in the vertical position and compared to supine reference values. Until vertical reference values of PhA are available, caution is urged when interpreting PhA from vertical BIA assessments.