13. SWACSM Abstract

Evaluating the Effect of Electrode Placement on Phase Angle and Body Fat Percentage via the RJL Quantum Legacy Device

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ABSTRACT

To obtain the highest values for resistance (R) and reactance (Xc) during bioelectrical impedance analysis (BIA) it's recommended to measure on the right side of the body. Less is known if this relationship is true for phase angle (PhA) or when these variables are measured with the RJL Quantum Legacy device. **PURPOSE**: Evaluate the reliability, difference, and bias between bioelectrical impedance variables assessed on the left and right side of the body by the RJL Quantum Legacy device. **METHODS**: Thirty-eight young (18-38 yrs.), hydrated (urine specific gravity ≤1.020), men (n=16) and women (n=22) laid in the supine position for 15 minutes to allow for bodily water compartment stabilization prior to having three measurements of R, Xc, and PhA at 50 kHz on the left and right sides of their body. Paired samples t-tests were used to determine side differences in R, Xc, and PhA on both sides of the body. Cronbach's alpha reliability coefficient was used to evaluate the internal consistency of the device. Systematic bias between sides for PhA was quantified via Bland-Altman plots with linear regression analysis. Alpha of .05 was used to determine statistical significance. **RESULTS**: No significant differences were observed for R (564.7 ± 94.5Ω, 562.1 ± 92.3Ω; p=.407), Xc (68.9 ± 7.4Ω, 69.4 ± 8.0Ω; p=.143), or PhA (7.09 ± .94°, 7.15 ± .84°; p=.083) when measured on the left and right sides, respectively. Cronbach's alpha showed that the RJL device had excellent internal consistency across the three assessments on both sides for the measurement of R (.999), Xc (.998), and PhA (.998). A systematic bias between sides for PhA was identified so that values on the right side was significantly lower than on the left when PhA was greater than 6.50° (p=.006). **CONCLUSION**: It's recommended that R, Xc, and PhA are measured on the right side of the body, but we observed no difference and excellent reliability between these variables when assessed on either side. Only measuring PhA on the right side may underestimate and ultimately misclassify individuals with greater PhA values. We recommend measuring on the left side to confirm that the highest PhA is being represented for individuals with a PhA ≥6.50°. While we observed a statistically significant bias, more research is warranted to determine whether this relationship is of clinical importance.