TACSM Abstract

Acute Resistance Exercise Influences Bioelectrical Impedance Analysis Segmental Fat Mass Estimates

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ABSTRACT

Bioelectrical impedance analysis (BIA) is an attractive tool for routine assessment of human body composition. However, there is also concern regarding how some variables, particularly exercise, may affect its measurements and therefore limit the conditions under which this technology can provide useful body composition data. **PURPOSE**: The purpose of this study was to determine if acute, localized resistance exercise (RE) compromises the validity of BIA segmental fat mass (FM) estimates. **METHODS**: In a crossover design, 32 healthy, resistance trained adults (18 F, 14 M; age: 23.4 ± 2.3 y; height: 172.4 ± 8.7 cm; body mass: 74.9 ± 15.3 kg; body fat: 25.6 ± 8.4%) completed three conditions in a randomized order: lower-body resistance exercise (L), upper-body resistance exercise (U), and rest (R). The RE protocol included a warm-up consisting of 2 sets of 12-15 repetitions of 3 upper-body exercises (U), or 3 lower-body exercises (L), followed by 5 sets of 10 repetitions per exercise, with 1-minute rest intervals. The R condition involved no exercise. BIA (InBody 770) was completed immediately pre- and post-exercise and at 15-, 30-, and 60-minutes post-exercise. The effects of the acute RE session on BIA estimates of total and segmental FM were analyzed using linear mixed-effects models with condition and time specified as within-subject factors and a random intercept for participant. In all models, the reference groups were R for condition and the pre-exercise time point for time. **RESULTS**: Condition by time interactions were observed for total and segmental FM. Examination of model coefficients indicated that most condition by time interactions were attributable to differences in the U condition across time relative to the reference group (i.e., R condition at baseline). In relation to the reference group, mean decreases of 0.75 to 1.25 kg for total FM, 0.38 to 0.58 kg for trunk FM, 0.27 to 0.47 kg for leg FM, and 0.15 to 0.22 kg for arm FM were observed in the U condition ($p \leq 0.001$ for all). In contrast, no changes across time were observed in the L condition. **CONCLUSION**: These findings suggest that an acute bout of localized RE influences BIA total and segmental FM estimates to an extent that can compromise accurate interpretation of the results. These data corroborate the need for a period of rest from physical activity, particularly upper body RE, prior to BIA body composition assessment.