

## Body Fluid Estimation Via Segmental Multi-Frequency Bioelectrical Impedance Analysis Following Acute Resistance Exercise

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### ABSTRACT

Segmental multi-frequency bioelectrical impedance analysis (S-MFBIA) estimates body composition and fluids by passing electrical currents through the body and can separate the body into distinct segments.

The minimum required abstention from exercise before S-MFBIA is unclear. **PURPOSE:** The purpose of this study was to monitor changes in total body water (TBW), intracellular water (ICW), and extracellular water (ECW) estimated via S-MFBIA following acute, localized bouts of resistance exercise (RE).

**METHODS:** Thirty-two female (n = 18; age: 22.7 ± 1.4 y; height: 167.5 ± 7.5 cm; body mass: 66.6 ± 14.5 kg; body fat: 30.3 ± 6.2%) and male (n= 14; age: 24.2 ± 2.9; height: 178.7 ± 5.3; body mass: 85.7 ± 7.8 kg; body fat: 19.6 ± 6.9%) resistance-trained volunteers completed three randomly assigned conditions in a crossover design. Each RE protocol (RE<sub>UPPER</sub> or RE<sub>LOWER</sub>) consisted of three exercises and began with two warm-up sets of 12-15 repetitions per exercise. This was followed by a RE circuit of 5 sets of 10 repetitions per exercise with a one-minute rest interval between circuits. In the resting (REST) condition, participants did not complete any physical activity. S-MFBIA was performed at five timepoints: pre-exercise, immediate post-exercise, 15-, 30-, and 60-minutes post-exercise. Data were analyzed using linear mixed-effects models with a random intercept for participant. In all models, REST was the reference condition, and pre-exercise was the reference time point. **RESULTS:** Although body mass did not differ between conditions, condition by time interactions were observed for TBW, ICW, and ECW ( $p < 0.001$  each), with the higher values observed at post-exercise time points in RE<sub>UPPER</sub> as compared to the REST condition. Mean differences between RE<sub>UPPER</sub> and REST for TBW, ICW, and ECW ranged from 0.6-1.0 kg, 0.4-0.6 kg, and 0.2-0.4 kg, respectively. Conversely, RE<sub>LOWER</sub> did not alter fluid estimates. **CONCLUSION:** An acute increase in TBW, ICW, and ECW is detected by S-MFBIA after a single bout of upper body, but not lower body, RE. This could be due to the smaller initial diameter and greater relative change in diameter of the arms as compared to legs. Due to the potential of artificial body fluid changes, users should avoid exercise - particularly upper body exercise - prior to S-MFBIA assessments.