TACSM Abstract

Body Composition Estimation in Youth Athletes: Agreement Between Two-Component Methods

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Category: Doctoral

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ABSTRACT

Body composition techniques such as skinfold measurements, air displacement plethysmography, and underwater weighing are commonly performed in athletic populations, particularly in youth athletes who may not have access to other laboratory methods. However, little is known whether such body composition estimates can be directly compared across techniques. **PURPOSE**: To determine the agreement between common two-component (2C) body composition techniques. **METHODS**: 90 youth athletes (Males: 39; Females: 51; Age: 18.2 ± 2.4 years; Height: 172.0 ± 9.9 cm; Body Mass: 69.0 ± 12.5 kg; Underwater Weighing [UWW] Body Fat Percentage [%BF]: 20.2 ± 7.0%) participated in this study. 2C estimates of %BF were determined via UWW, air displacement plethysmography (ADP), and 7-site skinfold (SKF) using the applicable Jackson-Pollock equation. Body mass was measured via calibrated scale. Agreement between methods was quantified using Lin's concordance correlation coefficients (CCC). Estimates of body fat percentage were also compared between techniques using paired samples t-tests ($\alpha < 0.05$) and equivalence testing, with the threshold of equivalence set at ± 2% body fat. **RESULTS**: Mean ± SD %BF estimates were 20.2 ± 7.0% (UWW), 18.7 ± 7.3% (ADP), and 16.1 ± 7.2% (SKF). Mean differences between methods were 1.6% [95% CI: 0.8, 2.3] for UWW vs. ADP, 4.1% [95% CI: 3.4, 4.8] for UWW vs. SKF, and 2.6% [95% CI: 1.9, 3.2] for ADP vs. SKF. Paired-samples t-tests revealed significant differences between %BF estimates for each comparison. Likewise, no methods were found to be equivalent, based on a ± 2% BF equivalence range. CCC values were 0.855 for UWW vs. ADP, 0.759 for UWW vs. SKF, and 0.844 for ADP vs. SKF. **CONCLUSION**: This study suggests limited agreement between 2C %BF estimates derived from three common assessment techniques. Hypothesis testing revealed significant differences between methods, and the magnitude of these differences resulted in non-equivalence at ± 2% BF. Based on these results, it appears that direct comparisons between 2C %BF estimates from these different techniques should be avoided if possible. Though the magnitude of the differences between techniques may be acceptable in certain contexts, coaches and clinicians should strive to utilize the same assessment methodology when examining and comparing body composition results across time.