TACSM Abstract

Evaluation of Fat-free Mass Characteristics at Different Adiposity Levels: Impact of Weight Status Stratification Method

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ABSTRACT

The method used to stratify weight status when evaluating fat-free mass (FFM) characteristics has primarily been based upon body mass index (BMI) and not body fat percent (BF%). As a result, it is unknown whether deviations in FFM characteristics are similar when stratifying weight status based upon BMI or BF%. Purpose: The purpose of this study was to evaluate FFM characteristics at different adiposity levels when stratifying weight status via BMI and BF%. Methods: 150 adults (50% males) participated in this study. 3-compartment (3C) model body composition was based upon body density (Db) via air displacement plethysmography (ADP) and total body water via bioimpedance analysis. FFM density (DFFM), residual (RFFM), and hydration (HFFM) were evaluated in all subjects. The Db obtained from a stand-alone assessment of ADP (2C-Db) and 3C model (3C-Db) were also compared between groups. Subjects were stratified based upon weight status (BMI and BF%). First, subjects were divided into a normal weight (NW-BMI), overweight (OW-BMI) or obese (OB-BMI) group, which were based upon BMI values of 18.5-24.99 kg/m² (n=50), 25.0-29.99 kg/m² (n=50), and ≥30.0 kg/m² (n=50), respectively. Next, subjects were divided into groups based upon BF% where normal weight BF% values (NW-BF%) for males and females were <25 and 35% (n=81), respectively, and obese BF% values (OB-BF%) were ≥25 and 35% (n=69), respectively. Results: The DFFM ranged from 1.096 – 1.097 g/cm³ for all groups in both weight status stratification methods (all p > 0.05). HFFM and RFFM were similar for all comparisons and ranged from 73.99 – 74.33% and 25.67 – 26.01%, respectively, for BMI groups and 74.02 – 74.26% and 25.74 – 25.98%, respectively, for BF% groups (all p > 0.05). In contrast, the 3C-Db (1.050, 1.036, and 1.013 g/cm³) and 2C-Db (1.052 and 1.012 g/cm³) were statistically significant for all comparisons between NW-BMI, OW-BMI, and OB-BMI respectively (all p < 0.05). Furthermore, 3C-Db (1.051 and 1.011 g/cm³) and 2C-Db (1.052 and 1.012 g/cm³) were significantly different when comparing NW-BF% and OB-BF% (both p < 0.05). CONCLUSIONS: Previous research has reported the FFM characteristics when stratifying weight status via BMI classification. As a result, it was unknown whether deviations in FFM characteristics existed when stratifying by BF%. Uniquely, the current study findings revealed that FFM characteristics are similar between groups regardless of the weight status stratification method (BMI or BF%).