TACSM Abstract

Offseason Body Composition Changes Detected by Dual-Energy X-Ray Absorptiometry Versus Multifrequency Bioelectrical Impedance Analysis in Collegiate American Football Athletes.

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ABSTRACT

In American football, offseason training is designed to promote increases in muscle strength and size in athletes. Tracking changes in body composition may confer key information about the effectiveness of training programs to football practitioners. **PURPOSE**: The present study assessed the relationship between body composition changes estimated by dual-energy x-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA) in football players during the initial period of an offseason training program. **METHODS**: Body composition in 29 NCAA Division III American football players (mean ± SD; age: 19.7 ± 1.5 y; height: 179.8 ± 6.6 cm; body mass [BM]: 96.1 ± 12.6 kg; DXA body fat: 20.9 ± 4.4%) was estimated using BIA (InBody 770) and DXA (Hologic Horizon) before and after a seven-week training intervention. Repeated measures analysis of variance, concordance correlation coefficients, and Bland-Altman analysis alongside linear regression were used to detect differences in cross-sectional estimates and change values, the strength of correlation, and determine the degree of proportional bias between methods, respectively. **RESULTS**: Significant method by time interactions were observed for BM ($p = 0.03$), arms fat-free mass (FFM) ($p = 0.03$), and legs FFM ($p = 0.01$). Post hoc comparisons indicated that DXA – but not BIA – detected increases in FFM of the arms and legs. Time main effects indicated an increase in total FFM ($p = 0.004$) and trunk FFM ($p = 0.002$) from pre to post. Finally, method main effects indicated higher leg FM values for DXA ($p < 0.001$) and higher trunk FM values for BIA ($p < 0.001$). No significant effects were observed for total FM ($p = 0.92$) or arms FM ($p = 0.13$). Changes in total BM (CCC = 0.96), FFM (CCC = 0.49), and fat mass (CCC = 0.50) were significantly correlated between BIA and DXA. **CONCLUSION**: DXA and BIA may similarly track increases in whole-body FFM in American collegiate football players; however, BIA may possess less sensitivity to detect segmental FFM increases, particularly in the appendages.