

BODY COMPOSITION COMPARISON: BIOELECTRIC IMPEDANCE ANALYSIS WITH DXA IN ADULT ATHLETES

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ABSTRACT

The primary purpose of this study was to investigate the accuracy of the DF50 BIA device using DXA as the criterion in two groups: endurance athletes and power athletes. The secondary purpose was to develop accurate %BF prediction equations for each group based on BIA data and/or the combination of BIA and anthropometric data.

80 male athletes (40 elite endurance athletes and 40 were power athletes), age 19-48 with BMIs ranging from 18.9 to 37.4 were recruited. Anthropometric measurements were taken. Body composition was assessed by DXA and BIA. An athlete-specific BIA prediction equation was developed by stepwise regression analysis using DXA as the criterion and BIA data and anthropometric measurements as predictor variables.

The DF50 BIA significantly overestimated %BF by 6.4 ± 0.5 in the entire group ($p < 0.001$) and in both the endurance group (6.1 ± 0.6 , $p < 0.001$) and the power group (6.7 ± 0.7 , $p < 0.001$). The endurance and power group showed no significant difference in the error of estimation by BIA ($p = 0.554$), indicating that BIA has the same error in both groups. The final prediction equation incorporated both anthropometric variables as well as BIA variables. The prediction equation produced an adjusted r^2 of 0.982 and SEE of 1.98 for the entire group. This equation used BIA measurements and anthropometric measurements, specifically trunk measurements to account for trunk size, a common source of error in BIA equations. Follow-up validation studies are necessary to further validate the equations produced.