

(23.8±6.3; $d=2.29$), BIS (28.2±5.4%; $d=0.40$), and BIA (24.4±5.3%; $d=1.50$). Lastly, moderate effects were present between ADP and BIS ($d=0.88$) and BIS and BIA ($d=0.83$). **CONCLUSION:** Results indicated that for athletic populations, large variances exist in BF% between methods, with a mean BF% differences ranging from 1.2% to 8% for males and 0.6% to 6.1% for females. Based on these findings, practitioners should interpret BF% cautiously, avoiding reliance on a single laboratory method and instead consider the combination of multiple devices to develop a more thorough profile of body composition.

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Comparison Of Two Techniques For Tracking Changes In Body Composition During A 24-week Fire Fighter Academy

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PURPOSE: To assess inter- and intra-method tracking of body composition changes throughout a 24-week fire fighter training academy.

METHODS: Data were collected across two consecutive training academies. The recruits ($n=37$; 27 ± 6 yrs.; 82.8 ± 14.8 kg; 176.8 ± 6.7 cm) performed supervised exercise programs 2-4 days/week during the academy in addition to the physical labor of their occupational training. Body composition was assessed via vertical multi-frequency bioelectrical impedance analysis (MF-BIA) and 3-site skinfold analysis (SKF) at baseline, as well as every six weeks during the academy. Recruits attested to having followed the standard pre-test guidelines for body composition assessment prior to each measurement session. A 2-way (method x time) repeated-measures ANOVA technique was applied for percent body fat (BF%), fat mass (FM), and fat-free mass (FFM) across the 5 time points; Bland and Altman plots displayed methodological biases and 95% limits of agreement (LOA) at the individual level.

RESULTS: Irrespective of method, BF% and FM were significantly lower ($p < .05$) at week 18 ($15.5 \pm 5.3\%$; 13.0 ± 6.1 kg) when compared to baseline ($16.9 \pm 6.2\%$; 14.6 ± 7.6 kg) and week 6 ($16.4 \pm 6.0\%$; 14.1 ± 7.3 kg); body mass and FFM remained similar. Regardless of time, there were significant between-method effects for BF%, FM, and FFM. Across each time point mean values for BF% and FM were mathematically higher (1.2% and 0.8 kg) and FFM consistently lower (0.9 kg) for MF-BIA than SKF; interactions between method and time were nonsignificant. Large individual 95% LOA between MF-BIA and SKF for BF% (5.7-6.9%), FM (5.0-6.1 kg), and FFM (5.0-6.1 kg) were noted; the smallest LOAs were at baseline and the largest were at the middle and end of the academy.

CONCLUSIONS: The instances of significant methodological differences at a given time point likely lack clinical significance for this male cohort. Regardless, the two devices cannot be considered interchangeable for serial assessments. However, this study demonstrates consistency in assessments when data are collected by skilled technicians using the same devices and standard techniques.

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The Influence Of Adipose Tissue Content On Upper Body Power In Males Across The Lifespan

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Strength athletes often carry more bodyfat than athletes in other sport contexts. In non-athletic settings, cross-sectional studies have found heavier adults to have greater absolute strength on average. These patterns suggest adipose tissue contributes indirectly to force output. **PURPOSE:** To evaluate the influence of adiposity on muscle power in upper body movements among males across the lifespan. **METHODS:** We measured body composition and power output in 68 males. Body composition was assessed using dual-energy X-ray absorptiometry; we exported lean body mass, total fat mass, body fat percent (BF%), and visceral fat content. Following these scans, subjects were tested on a Proteus device, performing a 6-repetition set of multiple exercises at 12 lb of electromagnetic isotonic resistance. We exported peak power achieved in straight-arm trunk rotation (mean of left and right directions), unilateral row (mean of both limbs), unilateral press (mean of both limbs), and bilateral biceps curl and triceps extension. Linear regression models measured the effect of adipose content on power output while holding age and lean mass constant. All analyses were performed with SPSS version 29.0. **RESULTS:** Subjects were 43.0 ± 8.8 yr, lean body mass was 142.7 ± 17.8 lb, total fat mass was 53.1 ± 25.3 lbs, BF% was $25.3 \pm 8.3\%$, and visceral fat mass was 2.0 ± 1.8 lb. Subjects produced 220.8 ± 35.5 W in trunk rotation, 175.2 ± 26.6 W in the row, 175.2 ± 29.9 W in the chest press, 154.9 ± 31.0 W in the biceps curl, and 179.8 ± 43.8 W in the triceps extension. Holding age and lean mass constant, total fat mass predicted a power reduction in trunk rotation ($\beta = -0.412$; $p = 0.008$), row ($\beta = -0.311$; $p = 0.008$), press ($\beta = -0.308$; $p = 0.019$), biceps curl ($\beta = -0.292$; $p = 0.033$), and triceps extension ($\beta = -0.426$; $p = 0.037$), and BF% predicted a power reduction in trunk rotation ($\beta = -1.237$; $p = 0.008$), row ($\beta = -0.863$; $p = 0.014$), press ($\beta = -0.862$; $p = 0.029$), biceps curl ($\beta = -0.849$; $p = 0.038$), and triceps extension ($\beta = -1.277$; $p = 0.037$). Relationships between visceral fat content and power were weaker: trunk rotation ($\beta = -3.990$; $p = 0.078$), row ($\beta = -3.344$; $p = 0.052$), press ($\beta = -3.866$; $p = 0.044$), biceps curl ($\beta = -3.071$; $p = 0.122$), and triceps extension ($\beta = -3.927$; $p = 0.189$). **CONCLUSION:** Holding age and lean mass constant, higher adiposity predicted poorer power output in all exercises.

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Reliability Of Bioelectrical Impedance Analysis To Track Off-season Body Composition Changes In Division 3 Football Athletes

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PURPOSE: Tracking body composition changes can provide important information regarding training programs for athletes. Fat free mass (FFM), fat mass (FM) and fat free mass index (FFMI) can provide insight regarding sport performance and training outcomes. Previous literature has shown FFMI to be a more appropriate metric for tracking ideal body composition change in the athletic populations. This study examined the reliability of bioelectrical impedance analysis (BIA) compared to dual-energy x-ray absorptiometry (DEXA) to track body composition changes in Division III football athletes across an entire off-season training program.

METHODS: A sample of Division III male college football athletes ($n=32$) participated in this study. Total body composition analysis was measured using DEXA and BIA at three time points throughout the off-season training program (January, May, August). These points represented the beginning (January), middle (May), and