

A Comparison of Flexed Vs. Relaxed Skinfold Methodology in College Aged Males and Females

HANNAH FORRESTER¹, CLAIRE PACELLI¹, MADDIE PFEIFFER¹, JOSHUA GANN¹, THOMAS ANDRE¹, QI ZHOU², JOON JIN SONG², DARRYN WILLOUGHBY¹, BRIAN LEUTHOLTZ¹, YUNSUK KOH¹

¹Department of Health, Human Performance and Recreation, Baylor University, Waco, TX

²Department of Statistical Science, Baylor University, Waco, TX

Category: Undergraduate

Advisor / Mentor: Brian Leutholtz (Brian_Leutholtz@baylor.edu)

ABSTRACT

Skinfold caliper measurements are routinely utilized in assessing individual's body composition and subcutaneous fat thicknesses. The precise separation of subcutaneous fat from muscle is critical to obtaining accurate measurements of body composition. The current investigation examined the accuracy of a flexed skinfold method (FSM) compared to the traditional relaxed skinfold method (RSF) and DEXA in 20 males (mean age = 20.8 ± 2.5 yrs) and 20 females (mean age = 20.8 ± 1.6 yrs). Body composition was assessed by FSM and RSF in a counterbalanced design within gender for RSF and FSM, using Lange skinfold calipers with the Jackson-Pollock 3-site method and the Siri's percent body fat equation. Each site (chest, umbilical, and thigh for males; triceps, super iliac, and thigh for females) was measured three times and the average was utilized to calculate body density and percent body fat. The same researcher performed all skinfold measurements and DEXA scan on a single occasion. A 2 X 3 ANOVA was used to determine the effect of gender (females and males) and different body composition methods (FSM, RSM, and DEXA) along with Bland-Altman plots. No statistical differences were observed between FSM and RSM in body fat percentage (FSM: 15.7 ± 7.5% vs. RSM: 16.0 ± 7.5%; p = 0.74), chest (FSM: 4.3 ± 1.2mm vs. RSM: 4.6 ± 1.6mm; p = 0.83), triceps (FSM: 18.7 ± 6.1mm vs. RSM: 18.6 ± 5.4mm; p = 0.52), super iliac (FSM: 15.2 ± 4.3mm vs. RSM: 15.1 ± 4.8mm; p = 0.62), or umbilical measurement (FSM: 17.1 ± 6.3mm vs. RSM: 17.3 ± 6.2mm; p = 0.62). However, there was a significant difference in thigh skinfold location, indicating that subcutaneous fat measured by FSM was lower than one measured by RSM (FL: 17.5 ± 7.2mm, RL: 18.5 ± 7.4mm; p = 0.003). Additionally, both FSM and RSM underestimated body fat percentage as compared to DEXA (FSM: 15.7 ± 7.5%, RSM: 16.0 ± 7.5%, vs. DEXA: 18.9 ± 7.5%; p < 0.01). It appears that assessing overall body composition using a flexed skinfold method does not necessarily improve the overall accuracy of skinfold body composition measurement when compared against a relaxed method.