Public Abstract

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Title:Three-Dimensional Body Scanning: A Novel Technique for Body Composition Assessment

INTRODUCTION: Accurate body composition assessment is crucial for determining health consequences due to excess body fat (BF). While several techniques exist there are few that are accurate, non-invasive, fast, and comfortable for subjects. The Three Dimensional (3D) body scanner is a new body composition assessment method that might serve as another option for investigators and practitioners. The purpose of this study was to determine the accuracy of the 3D body scanner at measuring body composition using dual energy x-ray absorptiometry (DXA) and Air displacement plethysmography (Bod Pod) as criterion measures. The 3D body scanner will be evaluated on its ability to work with differences in normal versus overweight subjects as determined by BMI. Also, a new prediction equation was created and compared to that of an existing equation used by the 3D body scanner developed by the Department of Defense (DoD).
METHODS: Eighty-Five male subjects (21.70Â± 2.28 yr old; 81.00Â± 12.21 kg; 25.37Â± 3.40 kg/m2) completed all body composition assessment techniques on the same day. Tests preformed included: DXA, Bod Pod, and 3D body scanning. Subjects did not eat or drink 2 hr previous to testing and did not exercise 4 hr previous to testing. Data was analyzed using SPSS version 17.0. Bland-Altmand plots, Pearson correlations, and a one-way ANOVA comparing means were performed. A prediction equation (3D MU) was created using a stepwise regression based on correlation to DXA.
RESULTS: Mean comparison of body composition techniques were as follows: DXA BF 16.30Â± 4.67; Bod Pod 12.17Â± 7.19; DoD 13.53Â± 6.43; 3D MU 16.49Â± 4.16. 3D MU had a SEE=3.09 over the entire sample compared to DoD SEE=3.67 and Bod Pod SEE=2.45. Although body volumes of Bod Pod and 3D Scanner were highly correlated (r = 0.984; p =0.001), the 3D Scanner underestimated body volume. Improvement in making consistent estimations of head, hand, and feet are necessary for the 3D body scanner to be used for body composition assessment.
CONCLUSION: Although the 3D body scanner shows promise as a method of evaluating BF, more work is needed before it can be considered an acceptable laboratory method of assessment. A 3D MU prediction equation was created that appears to be more accurate for young men than the current DoD equation.