PHENOTYPING OBESE SUBJECTS: MULTI-CONTACT ELECTRODE BIOIMPEDANCE SYSTEM FOR PRACTICAL BODY COMPOSITION MEASUREMENT.

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Practical Implications:

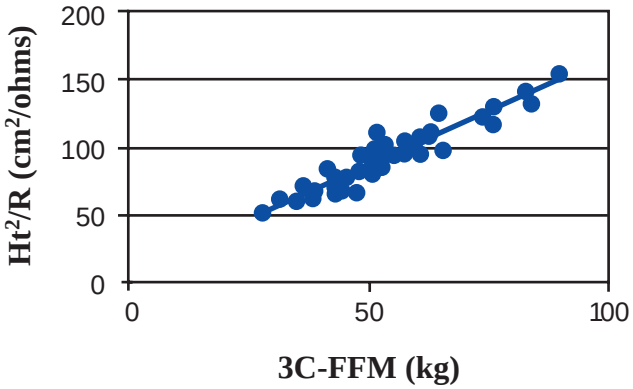
- Technical difficulties often arise when measuring fatness in moderately or severely obese subjects.
- These observations demonstrate that a multi-electrode BIA system designed for obese subjects can overcome these difficulties.

ABSTRACT

Objective: Phenotyping for genetic studies of human obesity is important and fatness is a key measurable characteristic. While fatness can be accurately measured using several methods in normal weight or overweight subjects, technical difficulties often arise in moderately or severely obese subjects. The present report describes a new BIA system developed specifically for evaluating total body fat and fat-free body mass (FFM) in subjects with BMI≥30 kg/m^2.

Design: Standing obese subjects grip heavy-duty mounted steel electrodes while the plantar surface of their feet maintain electrode contact. The 8-electrode system allows injection of a 50 kHz AC current across whole body and then detects corresponding tissue-induced impedance (Z) change.

Results: The system was calibrated by developing a prediction formula with FFM (kg) as dependent and Ht^2/Z and age as independent variables in 55 adults with BMI's 18 to 36 kg/m^2. FFM was estimated from Siri-3 compartment method based on underwater weighing and $^3H_20$ dilution. The resulting prediction model was: FFM (kg)=0.51xHt^2/Z-0.19xAge+ 15.2;R^2=0.95; p<0.001; SEE=3.2 kg (figure). These observations demonstrate the phenotyping potential of a multi-electrode BIA system designed for obese subjects.



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