WEIGHT LOSS-INDUCED SKELETAL MUSCLE LOSS: ACCURATE ESTIMATION BY BIOIMPEDANCE ANALYSIS (BIA)

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Practical Implications:

- Tanita BIA measurements can be used to measure loss of skeletal muscle in obese subjects during diet programs.
- Tanita BIA measurements can be used to monitor group skeletal muscle changes in weight loss studies.

ABSTRACT

Objective: Loss of skeletal muscle (SM) is a characteristic body composition change associated with weight reduction treatment. Prevention of dieting-SM atrophy with appropriate food composition or exercise is an important research goal.

Design: This study evaluated the accuracy of BIA (50kHz) in monitoring leg SM changes in a group of 71 obese women (X±SD, age, 40.0±7.3 yrs; BMI, 31.1±2.8kg/m^2) undergoing 16 week weight loss treatment on conventional low calorie diet.

Materials & Method: Leg-to-leg impedance, adjusted for stature (Ht^2/Z), was measured with contact electrode BIA system at the beginning and end of weight loss. Leg SM prediction model was developed in second group of 135 normal women using dual-energy X-ray absorptiometry as reference for leg SM [leg SM (kg)=0.25xHt^2/Z-0.03xAge+3.5; SEE = 1.42 kg, r=0.79, p<0.001].

Results: Subjects lost mean of 4.9 kg body mass, 4.3 kg as fat and 0.6 kg as fat-free mass. Pre-weight loss there was a strong correlation between predicted (Pr) and measured (M) leg SM (r=0.86, p<0.001; Pr=15.9±2.3 kg vs M=16.0±3.4 kg; p=NS). Similarly, agreement between Pr and M leg SM was good at post-weight loss (r=0.89, p<0.001; Pr=15.7±2.3 kg vs. M=15.8±3.4 kg; p=NS). There was a significant correlation between predicted and measured change in leg SM (r=0.45, p<0.001) and the mean change in Pr leg SM (-0.20±0.79 kg) was not significantly different from M leg SM (-0.22±0.52 kg).

Conclusion: These results strongly support the use of BIA for leg SM prediction in obese subjects and suggest a role for BIA in monitoring group SM changes in weight loss studies.

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