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Short Communication Open Access

# "Discriminant Models to Estimate the Body Weight Loss after a Six-month Long Diet and Exercise-based Intervention"

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## Short Communication

Decreased caloric intake and increased physical activity remain the first option for most weight management programs [1-3]. At the beginning of any intervention, baseline body composition can be known. Hence, it would be interesting and useful to estimate the BW change, with a mathematical model based on just pretreatment variables like body composition. In addition, as the weight loss is the main concern of the people who follow a weight loss program, the analyses of this study were done using body weight as the dependent variable. Body composition variables, like fat mass (FM) and fat-free mass (FFM) were considered as independent variables. We hypothesized that people with higher amount of FM and FFM at the beginning of the intervention could obtain a greater reduction of BW during the six-month long intervention. Therefore, the aim of this study was to create a mathematical model able to discriminate the body weight change based on initial body composition variables, and moreover to determine the importance of initial FM and FFM in discriminating the total amount of body weight loss.

The study included 239 overweight and obese participants (18-50 years; Body Mass Index (BMI)>25 and <34.9 kg/m2). Participants performed endurance, strength or a combined endurance and strength training three times per week, or followed the American College of Sports Medicine physical activity guidelines for body weight loss, during twenty-four weeks while having 25-30% caloric restriction. Two multivariate discriminant models were performed taking into account the groups below and above the mean body weight change.

The discriminant models obtained could discriminate the body weight change with a 65-70% of correct classification. BW, fat-free mass (FFM), and fat mass (FM) were shown to be the most discriminant variables for the discriminant models. The developed models could discriminate the BW change in the following way: if the discriminant score of the first model is close to -0.391 the BW change will be below the mean (from -2.2 to -8.5 kg), and if it is close to 0.512 it will be above the mean (from -8.5 to -17.6 kg). If the discriminant score of the second model is close to -0.354 the BW change will be below the mean, and if it is close to 0.446 it will be above it.

The first model (D×A) discriminated correctly the 72.4% of the cases between the two groups of the BW change within the seventy per cent of the sample, and the 64.4% of them within the remaining thirty per cent. The discriminant function obtained was (Wilks' Lambda=0.831, $x^2$ = 23.846; P= 0.001)

Discriminant score model 1 = -6.917 + (0.274 S) + (0.231 h× BW) - (1.016 × H) + (0.073 × A) - (0.12 × FM_D×A) - (0.207 × FFM_D×A)

The second model (BIA) discriminated correctly the 71% of the cases between the two groups of the BW change within the seventy per cent of the sample, and the 66.7% of them within the remaining thirty per cent. The discriminant function obtained was (Wilks' Lambda=0.862, $x^2$=18.745; P=0.005):

Discriminant score model 2 = -3.917 - (0.483×S) + (0.158 × BW) - (4.49 × H) + (0.079 × A) - (0.075 × FM_BIA) - (0.05 × FFM_BIA)

On one hand, Hall [4] stated that people with more initial body fat have a greater fraction of their weight change attributable to changes of body fat versus changes of lean tissue than people with less initial body fat. Since body fat contributes less than lean tissue to overall energy expenditure [5], the person with higher initial body fat will lose a greater amount of weight to achieve a new state of energy balance [4,6]. At the same time, FFM is responsible for the majority of resting metabolic rate [7].

In conclusion, people having higher FM and FFM at the beginning of an intervention will lose a greater amount of weight until the end of it.

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