

Variance of bioimpedance analysis measurements with physical activity and ingestion of food and water

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Introduction: Bioimpedance Analysis (BIA) is a method used to assess body composition based on the measure of body segments. BIA is relatively simple and fast, and also safe, non-invasive, cheap and uses portable equipments, that makes it widely used in clinical practice. However, certain factors may affect BIA's reliability in assessing body composition. This work aims to examine how the effect of physical activity and the ingestion of food and drinks may affect BIA's analyses.

Methods: 27 volunteer (24 females) university students were enrolled in this study. The measurements were taken in three non consecutive days with four evaluations each day and consisted on the Body Mass Index (BMI), and percentage of fat mass (%FM), measured by two equipments. The influence of water ingestion and practice of moderate physical activity were studied in the second and third days, respectively.

Results: On the first day we observed a decrease in the percentage of fat mass throughout the day. The BMI showed a tendency to increase throughout the day, with a decrease in the late afternoon. The interclass correlation coefficient (ICC) was higher for the BMI than the ICC for the %FM of both equipments (BMI: ICC=0.999, p<0.001; Equipment A: ICC=0.990, p<0.001; Equipment B: ICC=0.912, p<0.001). On the second day the participants who drank water had a tendency to have an higher %FM in the *before lunch* measurement. An opposite tendency was found in the control group. However, these results are not statistically significant. On the third day the physical activity had a tendency to have an opposite effect to the water ingestion (however not statistically significant).

Discussion: Body weight has daily changes that arise from the ingestion of food and beverages and physical activity. In particular, it decreases during the day, having a peak after lunch. The BIA analysers appeared to be more affected by those variations, since BMI had an higher internal consistency of measurements than the %FM measured by both equipments.