Effect of mechanical and metabolic factors on motor function and fatigue in obese men and women: a cross-sectional study.

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Background: Mechanical overload and poor quality of contractile elements related to metabolic abnormalities concur to motor disability of obesity. The independent contribution of these factors to motor dysfunction in obese individuals is scarcely defined.

Aim: Aim of the study is to test the hypothesis that metabolic factors may independently affect motor function in obesity.

Methods: Leg maximum power output per unit body mass (ŴMb), per unit fat-free mas (ŴFFM) and fatigue in daily functioning were assessed in 635 obese [body mass index (BMI)≥35 kg/m^2] individuals (286 men, 349 women) aged 19-78 yr. The independent effects of age, BMI, insulin resistance and the five components of the metabolic syndrome on ŴMb, ŴFFM and fatigue were evaluated by multivariate analysis.

Results: A multiple regression analysis revealed that in both genders ŴMb (denoting the individual's performance capability during anaerobic tasks) was independently reduced by age (p<0.001), BMI (p<0.05-0.001) and abnormalities of glucose metabolism (p<0.06-0.01), while ŴFFM (representing the muscle intrinsic anaerobic capability) was affected only by age (p<0.001) and glucose metabolism impairment (p<0.06-0.01). In both genders fatigue was increased by age (p<0.001) and BMI (p<0.05-0.01), but augmented by low levels of HDL-cholesterol in men only (p<0.05).

Conclusions: Besides depending on mechanical overload and age, low muscle power output in obese individuals was independently associated also with metabolic abnormalities related to impaired glucose homeostasis. Fatigue and performance, although similarly influenced by age and body mass excess, are affected by different metabolic factors.

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