Original research

Physical fitness predicts adiposity longitudinal changes over childhood and adolescence

Luís Paulo Rodrigues a,b,*, Raquel Leitão c, Vítor P. Lopes a,d

a Research Centre in Sports Sciences, Health Sciences and Human Development (CIDESD), Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal
b School of Sports and Leisure at the Polytechnic Institute of Viana do Castelo, Viana do Castelo, Portugal
c School of Education at the Polytechnic Institute of Bragança, Bragança, Portugal
d School of Education at the Polytechnic Institute of Viana do Castelo, Melgaço, Portugal

1. Introduction

The prevalence of obesity in childhood and adolescence is increasing worldwide both in developed countries and those undergoing economic transition. This evidence represents an obvious secular trend in the velocity of fat deposition along individual growth, and of particular interest to developmental studies, during childhood and adolescence periods.

Risk factors for childhood obesity include parental fatness, high birth weight, diet (including early infant feeding practices), rate of maturation (especially among girls), physical inactivity, low levels of physical activity, low socioeconomic status, and several behavioral and psychological factors. Although the relative importance of specific risk factors are not ordinarily specified at the individual level, a sedentary lifestyle and excessive energy intake are often considered as key mechanisms contributing to the potentially unhealthy weight gain and obesity.

The primary component in the excessive weight gain phenomenon in children is subcutaneous adiposity. Nevertheless, given that tracking coefficients for fatness show to be only low to moderate during childhood and adolescence, there seems to be room to improve our knowledge about fat development using additional predictors. Among other possibilities, but paramount to a holistic view of developmental health, physical fitness has surely proved to be a good candidate. We know that being unfit during childhood and adolescence is associated with a greater risk of obesity, and that higher fitness levels afford for a better insulin sensitivity profile, thus emphasizing the role of fitness even among overweight and obese children.

As to our knowledge, information on the prediction of adiposity growth over these critical periods (childhood and adolescence) for obesity development is scarce or nonexistent. Although an inverse relationship between physical fitness and overweight has been found among school-aged children, the direction and magnitude of the causation is not clearly established. So, the purpose of this study is to longitudinally investigate the effects of physical fitness