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ORIGINAL ARTICLE

Effects of a 12-week physical education program on the body composition of 10- and 11-year-old children

Effets d'un programme d'éducation physique de 12 semaines sur la composition corporelle d'enfants de 10 et 11 ans

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KEYWORDS

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Summary

Objectives. – The purpose was to study the effects of a physical education (PE) program of vigorous-intensity physical activity (PA) on the body composition of children.

Methods. – This investigation involved 120 school children from 10 to 11 years old (66 males 10.36 ± 0.49 years, and 54 females 10.65 ± 0.48 years). The variables measured were: body weight, fat-free mass (FFM), fat mass (FM), body mass index (BMI), fat-free mass index (FFMI), fat mass index (FMI) and total body water (TBW). The design was experimental with two groups, experimental group EG (vigorous-intensity PA) and control group CG (moderate-intensity PA).

Results. – Males of CG significantly improved body weight, FFM (kg) and TBW; males of EG significantly improved body weight, FFM (kg and %), FFMI, FM (%), FMI and TBW. Females of CG significantly improved body weight, FFM (kg) and TBW; females of EG significantly improved body weight, FFM (kg and %), FM (%) and TBW.

Conclusions. – Both training procedures improved body composition but more aspects of it (body weight, FFM kg and %, FFMI, FM %, FMI and TBW) are improved by vigorous-intensity PA.

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MOTS CLÉS

Poids corporel ;
Surpoids ;
Obésité ;
Jeunesse ;
Activité physique

Résumé

Objectif. – L'objectif était d'étudier les effets d'un programme d'activité physique (AP) d'intensité élevée sur la composition corporelle des enfants.

Méthode. – Cette enquête a porté sur 120 écoliers de 10 à 11 ans (66 garçons $10,36 \pm 0,49$ ans et 54 filles $10,65 \pm 0,48$ ans). Les variables mesurées étaient : poids corporel, la masse maigre (MM), la masse grasse (MG), l'indice de masse corporelle (IMC), l'indice de masse maigre (IMM), l'indice de masse grasse (IMG) et l'eau corporelle totale (ECT). Nous avons comparé deux groupes : le groupe expérimental GE (AP d'intensité élevée) et le groupe témoin GC (AP d'intensité modérée).

Résultat. – Les garçons du GC ont amélioré significativement le poids corporel, la MM (kg) et l'ECT ; les garçons du GE ont amélioré significativement le poids corporel, la MM (kg et %), l'IMM, la MG (%), l'IMG et l'ECT. Les filles du GC ont amélioré significativement le poids corporel, la MM (kg) et l'ECT ; les filles du GE ont amélioré significativement le poids corporel, la MM (kg et %), la MG (%) et l'ECT.

Conclusion. – Les deux programmes d'entraînement ont amélioré la composition corporelle, mais davantage de paramètres de composition corporelle ont été améliorés par l'AP d'intensité élevée.

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1. Introduction

Body composition (BC) can be understood as the division of body weight in different compartments that constitute the human body [1]. Therefore, BC analysis allows to know the proportions of the various constituents parts of the human body [2].

The model traditionally used to evaluate BC is the model of two compartments, or bicompartimental, which posits that the human body is composed of a part of fat mass and another part of fat-free mass; or alternatively, fat mass and lean mass [2].

Body composition is closely related to people's health [3]. In addition, measurement of BC allows the early detection of certain diseases [4]. There is an increased prevalence of obesity during childhood, which can also lead to chronic diseases related to inactivity and obesity in adulthood [5]. Currently childhood obesity is one of the major concerns regarding long-term health [6].

Consequently, any action aimed at improving body composition in the population is justified, as it entails simultaneously improved health and reduction of the possibility of disease. Physical activity is proposed as the ideal means to improve physical fitness and body composition in children and adolescents, according to numerous studies [3] and [7–11]. Physical activity can also be beneficial for the body composition of people with special needs, such as schoolchildren with ADHD [12].

However, recent research indicates that schoolchildren are not doing enough physical activity during the day [13], because nowadays in society, the need to move and make any kind of physical effort is ever decreasing, and there are numerous behaviors that involve being seated for a long time throughout the day [14].

Overall, there is consensus on the need to increase levels of physical activity, since, according to different studies, regular physical exercise has a significant effect on weight

loss due to important changes in circulation, hormonal status, the nervous system, the transport of substrates and the mobilization of lipids [15].

In this sense, the profile of body composition and physical fitness of children can improve with a multidisciplinary program that includes behavioral changes regarding physical activity and diet, although it should be in a continuous and controlled manner [16].

Likewise, high levels of physical activity, practiced regularly, can provide protection against obesity in children and adolescents [17]. Besides, a higher number of minutes of vigorous physical activity is associated with indicators of lower adiposity and better physical fitness in schoolchildren aged 9 and 10, while less time is related to low cardiorespiratory physical fitness and an increased likelihood of being overweight and obese [18].

Nevertheless, it is necessary to take into account the intensity factor, since it is possible that a certain threshold of intensity may influence to a greater or lesser extent individual body composition [19]. Several studies have found significant relationships between physical activity (especially vigorous) and healthy body composition [20]. In the same vein, an aerobic exercise program coupled with dietary changes is effective for children who are overweight or obese and could have positive effects on body composition and healthy physical fitness [21].

Due to the direct relationship of body composition with an individual's state of health, more intervention programs are needed to improve people's body composition and, consequently, their health. The main objective of this research is to determine the effectiveness of two 12-week PE programs on the body composition of 10- and 11-year-old schoolchildren. The study assumes that the program of vigorous-intensity exercises performed during the lessons of PE reduces fat mass and improves other parameters of body composition in children, to a greater extent than the program of moderate-intensity exercises.

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