

# A Commentary on 'Effects of Ninety Minutes per Week of Continuous Aerobic Exercise on Blood Pressure in Hypertensive Obese Humans'

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## Abstract

We previously reported evidence about the positive effects of continuous aerobic training (CAT) in hypertensive obese people. We showed that 90 min/week of aerobic exercise on a treadmill (70%-80% of the Maximal Heart Rate [MHR]) was able to improve the systemic blood metabolism of obese subjects. Therefore, we believe that reducing the recommended amount of aerobic exercise (150 min/week) by American College of Sports Medicine (ACSM) is a valuable strategy to for sedentary individuals with pathological conditions, since the suggested protocol is easy-to-perform, fast and enjoyable for the subjects. In this comment, we tempt to summarize the literature evidences regarding physical aerobic exercise on cardiac metabolism in hypertensive obese individuals. These findings may influence the consenting information over the prescription of physical activity for individuals with cardiac-associated pathologies.

**Keywords:** Continuous aerobic training; Obesity; Hypertension

## Introduction

It is known that overweight and obesity are related with comorbidities such as cardiovascular diseases [1] (CVD). While the physical inactivity (e.g. sedentarism) is a risk factor to the development of CVD [2], including heart failure, coronary artery disease, stroke, acute myocardial infarction and others [3]; the high intensity of effort during physical activity (achieving  $VO_{2max}$ ) has favourable effects on cardiovascular fitness [4]. It is growing the knowledge regarding the improvement in the metabolic functionality and decrease of adipose mass in response to physical training [5]. In this sense, several studies have demonstrated the beneficial effect of aerobic physical exercise, through improvements in mitochondrial functionality and oxidative metabolism [6,7]. It is known that reduced mitochondrial density and activity in cells can impaired peripheral blood flow, vascular dynamics and consequently decrease the cardiorespiratory functionality, leading to obesity and hypertensive-related comorbidities.

As any intervention, physical exercise shall be prescribed in an appropriate dose. During the last years, several strategies have been tested and studies investigating the different training loads have seen controversial. Therefore, in the present comment we will tempt to describe some of these strategies and discuss about current scientific evidences regarding exercise prescriptions to obese hypertensive individuals.

Recently, Barakat et al. [8] demonstrated that chronic aerobic exercise performed 3 days/week during ~50 min per session prevented hypertension and weight gain in pregnant women. Moreover, it is known that there is a correlation between weight gain and gestational diabetes mellitus, which culminates in higher risk of adverse outcomes during pregnancies [9]. Wang et al. [9] also found that 30 min of cycling aerobic exercise, 3 days/week is also associated with prevention of hypertension and weight gain in Chinese pregnant women. Magro-Malosso et al. [10] performed a systematic review and meta-analysis with more than 5000 pregnant women, and they also found that chronic aerobic exercise, performed about 30-60 min/week, 2-7 times/week significantly reduced the risk of gestational hypertensive and cardiac-related risk factors.

A single bout of 45 min water aerobic exercise, performed at 70-75% of MHR, also reduced the systolic blood pressure (SBP) in obese women [11]. In the last decade, Rousseau et al. [12] showed that endurance exercise performed 3 days/week, at 60% of hearth rate reserve and was

sufficient to reduce the metabolic risk profile in obese postmenopausal women. Church and colleagues investigated the effects of different doses on cardiorespiratory fitness (CRF) in obese postmenopausal women during 6 months, they showed that there is no increase in systolic blood pressure, although there is progressive increase in  $VO_{2max}$  [13]. Latter, Church's group demonstrated that higher doses of aerobic exercise is more effective in improve blood pressure and CRF [13]. Following Lee's [14] idea about dose-response aerobic exercise: "Even a little is good, more is better", Ash et al. [15] published interesting evidence, demonstrating that for middle-aged obese and pre-hypertensive adults, aerobic exercise (60%  $VO_{2max}$ , 30 min), is better than resistance exercise for improvements in CRF. In accordance to the evidences above, we found that 24 sessions of walking in treadmill during 30 min (70-80% of MHR) three times a week, the reduction of the recommended amount of exercise by 40% (90 min/week), was able to improve blood pressure in hypertensive obese humans [16,17]. The possible mechanism for this improvement can be attributed to the benefit of the regular exercise. It's know that regular exercise can changes several metabolic paramers including anti-hypertensive effect such as, decrease vasoconstriction, catecholamine's levels, glucose uptake and insulin sensitivity in the muscle, reduction of inflammatory markers, consume of fat by muscle contraction and induction of lipolysis, etc. [18], all this independent of the weight loss, however, we didn't compare any of these parameters in our study.

## Cares to Prescribe Aerobic Physical Exercise for Obese Hypertensive Individuals

In our study and during this comment, we present several evidences demonstrating the effects of aerobic exercise in regulating cardiac-related risk factors and improving CRF [17]. However, it is still controversial the

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prescription of physical exercise to obese hypertensive individuals. The ACSM Position Stand for Exercise and Hypertension [19] recommend that, for obese individuals, an exercise program shall emphasize a caloric expenditure of 300 kcal/day, moderated-intensity and prolonged exercise (ex: walking). Other sources recommend a training frequency in a range of 3-5 days/week, 150 min weekly, on intensity in a range of 40-60% of  $VO_{2max}$  or a 12-13 range in Borg scale [19]. However, recently studies have been shown that moderated-aerobic exercises performed at higher intensities and lower volumes, also demonstrated effective improvements in CRF and exercise-program adherence [9-14,17]. Taking together, the new evidences regarding physical exercise prescription to obese hypertensive individuals lead us to conclude that aerobic exercise at higher intensity-zones (60-80% MHR), lower total-weekly volume (~90-min/week) and interspaced exercised-days are also a valuable strategy to enhance cardiorespiratory outcomes and prevent/reverse cardiovascular risk factors in these subjects. Also, once that the regular exercise can change several metabolic parameters, the reduction of the period training can be an alternative and motivational condition to insert people into the regular exercise program including those who most need and they do not.

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