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ORIGINAL ARTICLE

Exercise intensity and energy expenditure during a mini-trampoline rebounding exercise session in overweight women

Quantification de l'intensité de l'exercice et de la dépense énergétique pendant une session de minitrampoline chez des femmes en surpoids

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Received 15 February 2016; accepted 21 June 2016

KEYWORDS

Mini-trampoline;
Rebounding exercise;
Exercise intensity;
Energy expenditure;
Overweight women;
Cardiovascular
health;
Body weight control

Summary

Objectives. – The purpose of this study was to estimate the exercise intensity and energy expenditure during a mini-trampoline rebounding training session in a group of overweight women to assess whether such fitness activity meets the guidelines for exercise prescription in adults of the American College of Sports Medicine (ACSM) and whether it can be recommended for an overweight female population.

Equipment and methods. – To achieve the aims of our study, eighteen overweight women (36.7 ± 10.6 years, BMI: 26.8 ± 1.6 kg/m²), were enrolled. All the participants underwent a maximal cardiopulmonary exercise test and the main physiological variables were recorded. Afterwards, the subjects performed a mini-trampoline rebounding exercise session where

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<http://dx.doi.org/10.1016/j.scispo.2016.06.006>

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Please cite this article in press as: Cugusi L, et al. Exercise intensity and energy expenditure during a mini-trampoline rebounding exercise session in overweight women. Sci sports (2016), <http://dx.doi.org/10.1016/j.scispo.2016.06.006>

MOTS CLÉS

Minitrampoline ;
Intensité d'exercice ;
Dépense
énergétique ;
Femmes en surpoids ;
Système
cardiovasculaire

exercise intensity and energy expenditure were measured with a heart rate monitor, a rating perceived exertion scale and a portable armband device, respectively. Successively, the physiological responses obtained from these two activities were compared.

Results. – The average heart rate throughout the mini-trampoline exercise session, lasting 46.1 ± 5.0 min, was 132.3 ± 7.7 bpm, corresponding to $72.2 \pm 3.3\%$ of that obtained in the preliminary maximal test. The estimated energy expenditure of participants to mini-trampoline rebounding exercise session was 6.9 ± 0.8 kcal/min, corresponding to a total of 317.3 ± 45.7 kcal for the duration of the entire session.

Conclusions. – Our results showed that mini-trampoline rebounding exercise is a vigorous physical activity, which can be identified as an effective way to achieve an optimal level of training, as indicated by the ACSM guidelines.

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Résumé

Objectifs. – Cette étude vise à évaluer l'intensité de l'exercice et la dépense énergétique pendant une session d'entraînement sur minitrampoline chez un groupe de femmes en surpoids, et à déterminer si cette activité physique est conforme avec les *guidelines for exercise prescription in adults* de l'American College of Sports Medicine (ACSM), et peut ainsi être recommandée pour une population de femmes en surpoids.

Sujets et méthodes. – Dix-huit femmes en surpoids ($36,7 \pm 10,6$ ans, BMI : $26,8 \pm 1,6$ kg/m²) ont été incluses dans cette étude. Toutes les participantes ont préalablement réalisé un test d'effort maximal dont toutes les principales variables physiologiques ont été enregistrées. Les sujets ont ensuite réalisé une séance de minitrampoline dont l'intensité et la dépense d'énergie ont été contrôlées avec un actimètre, une échelle d'intensité de l'effort perçu et un brassard portable. Les données physiologiques obtenues lors du premier et deuxième exercice ont été comparées.

Résultats. – La fréquence cardiaque moyenne pendant la session de minitrampoline, qui durait $46,1 \pm 5,0$ min, a été de $132,3 \pm 7,7$ battements par minute, ce qui correspond au $72,2 \pm 3,3\%$ de la fréquence obtenue lors du test d'effort maximale initial. La dépense énergétique des participantes à la session de minitrampoline a été estimée à $6,9 \pm 0,8$ kcal/min, ce qui correspond à un total de $317,3 \pm 45,7$ kcal pour la durée totale de la séance.

Conclusions. – Nos résultats montrent que l'exercice sur minitrampoline est une activité physique vigoureuse qui peut constituer un moyen efficace pour atteindre un niveau d'entraînement optimal conforme aux préconisations de l'ACSM.

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1. Introduction

Mini-trampoline rebounding exercise (MRE) is a long time known and very popular fitness workout. The first research in this field began in the 1980s with preliminary studies by Carter [1] and White [2]. In the first instance, the authors attempted to outline the characteristics of the rebound while describing the effects on the human body. Subsequently, other studies on rebound carried out by Bhat-tacharya et al. confirmed the beneficial effects of this particular training on the human body, especially in people exposed to absence of gravity [3].

Exercise on the mini-trampoline consists of a multi-component approach which involves strength and balance training, physical fitness, body stability, coordination of muscle responses and spatial orientation [4–10].

Due to the multiple effects of rebounding on motion patterns, several recent studies were undertaken focusing on the usage of mini-trampoline. Some of these were tailored to evaluate its effect on improving athletes' performance [11,12] while others investigated the role of MRE training in improving balance ability and movement coordination

[13–15]. Besides, studies on the use of MRE protocols in special populations are increasing, with the aim to highlight its usefulness in medical rehabilitation treatment and its positive psychological effects [14–18].

Despite the spread and interest in MRE as a fitness workout, only a few studies dating back to 1990s examined the exercise intensity (ExI) during an MRE session [2,4,8]. Indeed, little is known about the energy expenditure (EE) in the context of MRE, especially if measured in overweight and obese subjects, whose attendance of gym fitness classes has been continuously increasing in the last decade [19]. Conversely, the assessment of EE and ExI would be particularly useful to clarify whether MRE can improve the overall health status of people who perform this specific exercise. In addition, such approach could reveal whether the MRE is an effective activity for those individuals, such as overweight women, who have a particular need to follow specific exercise prescription guidelines as recommended by the American College of Sport Medicine (ACSM) [20,21].

Starting a program of physical training is particularly encouraged in individuals with a higher cardiovascular risk profile, where the exercise is acknowledged as a key point

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