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Which Support Pants are the Most Effective for Burning Body Fat?

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Abstract

Obesity is the main cause of lifestyle-related disease, which is in turn the main cause of death in Japan. Aerobic exercise is more effective than anaerobic exercise in burning body fat. The present study identified conditions that enhance the burning of body fat during aerobic exercise, including the effects of wearing support pants. Twenty-one young Japanese women completed aerobic exercise sessions while wearing each of three types of support pants. Total body fat burning during aerobic exercise was 16 times greater than that at rest. Partial-compression garments helped reduce body fat more efficiently than both non-compression and constant-compression pants.

Keywords: Support Pants; Body Fat Burning; Aerobic Exercise; Respiratory Metabolism; Clothing Pressure

1 Introduction

The main cause of death as a result of illness in Japan following World War II changed from infectious diseases, such as tuberculosis and pneumonia, to geriatric diseases, such as a cancer, heart disease, and cerebro-vascular disease. The onset and progress of geriatric diseases have been considered in terms of aging; however, it has become clear that the onset and progress of geriatric diseases are strongly related to lifestyle [1]. In addition, because symptoms similar to those of geriatric diseases have been increasingly observed in children owing to lifestyle disorders [2], the term geriatric disease was changed to lifestyle-related disease in 1996 by the Ministry of Health, Labour and Welfare, which then began implementing countermeasures. The main causes of lifestyle-related disease include obesity, and it is said that approximately 90% of cases of obesity are cases of simple obesity. Obesity [3, 4] is considered a contributing factor to 15 geriatric diseases and conditions, including diabetes [5], high blood pressure [6], dyslipidemia [7], myocardial infarction [8, 9], and cerebral infarction [10]. To prevent obesity and to live a healthy life, we should be careful about our eating habits and exercise regularly. In addition, it is necessary to maintain body fat at an appropriate level. Excessive caloric intake [11] and a lack of exercise contribute to reduced fitness and possibly to long-term illness. Furthermore,

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vigorous exercise is a demanding task for a person unaccustomed to such exercise. According to Mersy et al., aerobic exercise benefits health [12] by affecting lipoprotein metabolism in sedentary healthy young women [13]. We thus employed aerobic exercise in the present study using an ergometer as a simple machine with which to measure the work performed during exercise. Many factors affect the use of body fat during exercise. In the case of women in the low-temperature phase of their menstrual cycle, for example, aerobic exercise before lunch is most effective for maintaining the consumption of body fat [14, 15]. The season has also been clearly shown to affect variations in body fat [16-19]. The present study identified easily achievable conditions that enhance the consumption of body fat during aerobic exercise. The consumption of body fat was assessed by measuring respiratory metabolism before, during, and after aerobic exercise; the device used measured the amounts of inhaled oxygen and exhaled carbon dioxide for each lungful of air. The consumption of body fat was then calculated from the energy consumption and oxygen uptake. We also aimed to clarify the effect of support pants on the consumption of body fat by comparing lipid metabolism while wearing one of three types of compression pants (i.e., one constant-compression garment and two partial-compression garments) or non-compression pants during aerobic exercise.

2 Experimental Method

2.1 Experimental Pants

Figure 1 shows the three types of short compression pants and the (non-compression) control pants used in the present study. Subjects remained seated for 1 hour while wearing a short-sleeved 100% cotton t-shirt and one of 100% polyester running pants (A, non-compression pants as the control), basic compression pants with 80D (8.9 Tex) yarn (B), 80D (8.9 Tex) yarn pants that provide partial compression (C), or 110D (12.2 Tex) yarn pants with the same design as pants C(D). Pants A provided almost no compression, pants B supported the lower abdomen and thighs uniformly, and pants C and D provided varying amounts of partial compression, particularly over the lower abdomen and medial thigh [20-22]. The basic knitting structure of the compression pants was single-rib stitches. The tensile force and strain were measured using a KES-FB1-AUTO-A device (Kato Tech, Kyoto, Japan) at a speed of 0.2 mm/s, chuck of 5.0 cm, and maximum load of 20 gf/cm.

A Control | B Full compression pants (80D: 8.9Tex) | C Partial compression (80D: 8.9Tex) | D Partial compression (110D: 12.2Tex)

Fig. 1: Experimental pants [20-22]