Study on the Difference of Weight Reduction Effect between High-intensity Interval Training and Persistent Aerobic Exercise for Female College Students

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Abstract

Objectives: The aim was to study the effect of persistent aerobic exercise and high-intensity interval training (HIIT) on weight loss of female students. Methods: Seventy-two college students were selected as the research subjects, and they were randomly divided into the control group and the observation group. Thirty-six cases in the control group were doing the persistent aerobic exercise and 36 in the observation group were using the HIIT weight loss method. The waist-to-hip ratio, body weight, and body fat were observed and recorded in two groups. Results: The waist-to-hip ratio of female students in the control group was significantly lower than that in the observation group, and the difference between the two groups was statistically significant ($P < 0.05$). The weight loss rate of female college students in the observation group was significantly higher than that in the control group, and the difference between the two groups was statistically significant ($P < 0.05$). The changes in body fat in female college students in the control group were significantly greater than those in the control group, and the difference between the two groups was statistically significant ($P < 0.05$). Conclusions: Compared with the continuous aerobic exercise method, the HIIT weight-loss method has a more significant effect on female college students’ weight loss and has a certain safety. Keywords: High-intensity interval training weight loss, hip ratio, persistent aerobic

INTRODUCTION

Due to the bias of health and esthetic perspective, there are great misunderstandings on the cognition of weight loss among contemporary women, especially on the concept of a healthy diet, in which the contemporary female college students are more obvious.[1] The university began to be the point at which women grew up and entered the threshold of sexual maturity. At this point, women began to care about their physical beauty and men’s attention to themselves because of their age and knowledge.[2] Due to the restriction of social environment and cultural background, the cognition of health and beauty of Chinese female college students is in a vacuum period, especially in undeveloped cities. Here, obesity becomes another big crimson stone for female college students’ health and esthetics, which not only limits students’ pursuit of beauty but also conceals their health under the breath of youth.[3] At this point, most people only realize the impact of obesity on the United States and ignore the health problem and pay more attention to losing weight and blindly pursue the shortcut of weight loss – diet and a lot of exercises, not to mention whether such a way can become a weight-loss goal, the problems faced in the process, such as insufficient energy supply, loss of muscle, decline in basic metabolic rate, increased risk of accidental death, and so on, are worrying. At this time, the search for a healthy and effective way to lose weight is particularly important.

Overview

Throughout this research, we can see that the effects of diet and exercise on the body are also various. Therefore, scientific and reasonable diet and exercise as the main intervention for the prevention and treatment of obesity is particularly important.

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this research is only a forward-looking exploration. From the
data obtained from research, we can see that compared with
pure aerobic exercise, the combination of low high-intensity
interval training (HIIT) and aerobic exercise for overweight
and obese individuals’ body shape, body composition, fat
metabolism process, and the changes of inflammation level all
produced more effective intervention effect in varying degrees,
although it did not highlight its unique advantage in the effect
of aerobic tolerance. However, judging from the effect of low
trauma HIIT on glucose and lipid metabolism, low HIIT is
likely to have an effect on mechanical aerobic endurance, but in
view of the limitations of previous studies and the insufficient
argumentation in this study, further research is needed to
prove this inference. Overall, aerobic exercise combined
with HIIT is good for weight loss. However, to maximize the
effect of the combination of the two, it is necessary to take
part in the detailed exercise and diet. For example, we can
make a more standardized diet allocation for low impact. We
can also choose a more detailed diet comparison example for
reference (this study uses the Chinese Nutrition Association
residents’ Dietary balance Pagoda, such as adopting different
standards for different population groups). In addition, in the
aspect of exercise intensity, this research chooses medium-and
high-intensity aerobic exercise and can also try high intensity
or low intensity to analyze and research. From the point of view
of exercise mode, we can also try to take the way of resistance
exercises to intervene, to seek a more scientific and appropriate
model of exercise diet intervention, and to provide better
countermeasures for the prevention and treatment of obesity.

**Methods**

Excess oxygen consumption after exercise is characterized by
fat oxidation. The plasma-free fatty acid concentration began
to rise and remained unchanged for some time after exercise.
In addition, the relationship between triglycerides and the ratio
of free fatty acids in excess oxygen consumption after exercise
was observed. The results showed that the energy supply
level of lipid oxidation increased during this period. This
phenomenon is an important factor influencing the increase
of total excess oxygen consumption after formal exercise. Some
related experiments have also been carried out to study
the excessive oxygen consumption after exercise with two
different exercise prescriptions: high-intensity shorttime and
low-intensity longtime. The results showed that the excess
oxygen consumption of high-intensity shorttime exercise
prescription was significantly higher than that of low-intensity
longtime exercise prescription. Regular physical activity
can also improve the resting metabolic rate to some extent.
Previous studies have shown that during the recovery period
after exercise, the body temperature will increase to a certain
extent, and this phenomenon is the key factor that causes most
of the energy consumption of the body at this stage [Figure 1].

Some studies have shown that, to some extent, the fluctuation
of body temperature and muscle temperature and oxygen
consumption is consistent. In addition, the literature shows
that when the body’s body temperature rises by 1°C within the
appropriate temperature range, the basal metabolic rate of the
body will increase by about 13%, and the energy consumption
of the body will be increased to a corresponding extent by the
increase of the basic metabolism rate of the body. The results
show that there is also a statistical difference between male
and female in excess oxygen consumption after exercise, and the
absolute value of excess oxygen consumption after exercise is
related to the body weight index. With the increase of age, the
functional level of the body will decrease to a certain extent,
and the resting metabolic rate will also decrease. In addition,
people with training experience can improve cardiopulmonary
fitness through exercise training, thus developing a running
economy. Therefore, for those who have the desire to reduce
fat, we can make good use of the time of excessive oxygen
collection after exercise and control weight by increasing
energy metabolism during this period. In addition, the function
of the respiratory system is effectively improved. Exercise
helps to increase thoracic compliance, reduces breathing
resistance, and increases lung volume. The results showed that
the vital capacity of obese female college students increased
after completing the two exercise prescriptions, and the
difference was significant. This may be due to the low intensity
of exercise, the small oxygen requirement per unit time and the
small stimulation of pulmonary alveoli in group m compared
with group h, which makes the improvement of pulmonary
function not obvious [Figure 2].

**Results**

The effect of aerobic exercise on female college students’ body
form is mainly reflected in the change of body composition. In
general, the body’s fat-free weight is relatively constant, and fat
weight is the main factor of body composition changes. For fat
loss, total energy consumption is more important than that in
simple exercise. Some studies have shown that high-intensity
exercise can stimulate energy consumption after exercise, but
low-intensity aerobic exercise cannot produce this effect. Dutch
Scholar Saris et al. have found that it takes less exercise time
to achieve the same energy consumption as low intensity and
longtime exercise, and the energy substrates consumed by the

![Figure 1: Effect of high-intensity interval training exercise on the human body](image)
two exercise intensities within 24 h were almost the same. Another effect of exercise on the body is by regulating the endocrine system. Compared with low-intensity exercise, the sympathetic nerve controls muscle movement, produces more adrenaline and norepinephrine, increases resting metabolic rate, stimulates energy consumption after exercise, maintains high metabolic level for a long time after exercise, and promotes the effect of weight loss. After intensive exercise, it was also observed that the increase in growth hormone and thyroxin secretion also increased the resting metabolic rate and stimulated fat depletion. These studies illustrate the molecular mechanisms, by which it can effectively lose weight. In the quiet state, the heart rate decreased with the increase of cardiac output, which suggested that the increase of heart rate reserve was an important marker for the improvement of cardiac function. Long-term regular transport can increase the activity of complex enzymes in the oxygenated respiratory chain of linear particles, thus improve the whole function of mitochondria, provide sufficient energy for myocardial pump blood, and increase the ability of myocardial contraction. The ability of blood supply is strengthened. Vital capacity can not only reflect the maximum ventilation volume of the lung but also reflect the state of lung function. Some studies have shown that exercise can promote the coordination of breathing and movement. During exercise, respiratory muscle strength is increased and lung tissue elasticity is increased by constantly changing chest and abdominal pressure [Figure 3].

**Conclusions**

Using less time of HIIT exercise can achieve a better weight loss effect. The mechanism may be that excessive oxygen consumption is significantly higher than that of middle- and low-intensity exercise, and excess oxygen consumption is closely related to free fatty acid metabolism after high-intensity exercise. More conducive is to the movement of fat mobilization. Compared with medium intensity, HIIT intensity load is an effective way to interfere with obese and overweight female students, and the shorter time exercise is more conducive to the persistence of weight loss; therefore, HIIT exercise is more suitable for the weight loss prescription of young people. This experiment also shows that obese female students carry out HIIT; the prescription of weight loss exercise is safe and feasible.

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**Conflicts of interest**

There are no conflicts of interest.

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