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The acute and long-term effects of KAATSU downhill walking training on muscle growth

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Objective As a new training method, KAATSU Training has become a popular training method because of its obvious training effect, short period and high safety. In this paper, the acute and long-term response of the KAATSU downhill walking Training is discussed to explore its effect on muscle growth, and to provide a theoretical basis for the scientific pressurization of athletes, rehabilitation groups and fitness groups.

Methods (1) acute effects: 8 healthy male subjects received pressure and non-pressure slow downhill walking training at the same time and in good physical condition. Pressure in the pressure group was 240mmhg, and pressure bands were tied in the non-pressure group but no pressure. The downhill slope is 16%, the speed is 3km/h, and stride slow walk on the treadmill. Forearm venous blood was taken 15 minutes before training and 15 minutes after training. The concentration of growth hormone (GH), insulin (In), cortisol (C), blood testosterone (T), creatine kinase (CK) and UREA in blood samples were tested respectively. The fingertip blood lactate (Lac) was taken 2 minutes after training, and the subjects' subjective fatigue feelings (RPE) were recorded immediately after training. The changes of surface electromyography (EMG) during training were recorded, and changes of heart rate were recorded every 2 minutes. The thigh and calf circumference were measured before and after exercise.

(2) long-term effects: 14 healthy male subjects were randomly divided into the experimental group (KAATSU group 240mmhg, n=8) and the control group (no KAATSU group, n=6), with a slope gradient of 16% and a speed of 3km/h. 2 weeks for 10 days from Monday to Friday. The first week of Monday and the second week of Friday is the same as the acute effects test. At other times, the circumference of the thigh and the calf before and after the training were measured, the heart rate and the subjective fatigue feeling immediately after the exercise were recorded.

Results (1) The muscle circumference increased immediately after exercise in both groups. The change of thigh circumference after exercise in the KAATSU group was significantly higher than that in the non- KAATSU group ($P<0.05$).

(2) There were no significant changes in growth hormone, insulin, cortisol, testosterone, creatine kinase and blood urea before and after exercise ($P>0.05$), and no changes in creatine kinase 24 hours after training.

(3) The exercise heart rate of the pressure group was slightly higher than that of the control group, and the surface electromyography of the KAATSU group was significantly higher than that of the non- KAATSU group ($P<0.05$).

(4) There was no significant difference in subjective fatigue and blood lactic acid between the two groups ($P>0.05$).

(5) After two weeks of KAATSU downhill training walking, the muscle circumference of the leg in the KAATSU group was significantly higher than that of the control group ($P<0.05$).

Conclusions (1) One-time downhill walking training can increase muscle circumference and the KAATAU group was more obvious.

(2) KAATSU downhill walking training can increase muscle without causing muscle damage.

(3) KAATSU downhill walking training can collect more muscle fiber.

- (4) Under the KAATSU downhill walking training, the concentration of lactic acid is low, the subjective feeling is easy. The heart rate is slightly higher than the quiet level, which will not cause fatigue and will not affect the blood sugar level.
- (5) Long-term KAATSU downhill walking training can promote muscle growth.