

Application of EMS training system in physical training

Xin Li^{1,2}, Yitong Liu²

¹Physical Education Department, Luxun Academy of Fine Arts, Dalian, 116650, China

²Sports Institute, Liaoning Normal University, Dalian, 116029, China

Abstract: Based on the research that EMS training system simulates the brain signal of human body and directly transmits the motion signal to the muscle to make the muscle contract strongly, this study makes a horizontal analysis and comparison of normal athletes, rehabilitation people, obese people, white-collar workers and other people, and makes a quantitative analysis. EMS training system is more efficient and effective than traditional training methods. The advantage of convenience is to find a method to stimulate muscles through fast, effective and safe means, and find scientific and efficient training and rehabilitation methods for relevant people, which represents the future development direction of training and rehabilitation.

Keywords: EMS training system, rehabilitation, training

1. Basic introduction of EMS pulse impact system

EMS is understood in Chinese as "muscle electrical stimulation", which is mainly used for athletes' physical training and body rehabilitation. Its principle is that a wet electrode with pulse function directly contacts the skin, and then stimulates the brain nerve to complete the movement by imitating the contraction mode of muscle movement. Before use, it is linked by wired or wireless means, put on special close fitting sportswear, and exercise through the wireless instrument connected with the configured Bluetooth device. Its coverage area is five kilometers, which is mainly divided into three training modes: muscle strength training mode, cardiopulmonary function training mode and relaxation mode. In today's era, people's living standard has a fast pace and the time for physical exercise is short. EMS system brings convenient and efficient training methods to such people. At the same time, through the safe, effective and rapid weight loss concept and the management method of whole-body muscle training, more weight reducers can improve their quality of life, understand the weight loss concept, and start from the perspective of athletes, High intensity and long-time exercise training at least 2 or more times a day is prone to sports injury, loss of lean weight, energy consumption, etc. through EMS system, the exercise effect can be improved, and muscle stimulation can be carried out for people with certain injuries who are not suitable for exercise and rehabilitation, so as to promote muscle recovery and enhancement efficiently and conveniently, so as to promote the repair of sports injury.



Figure 1: Upper limb relaxation training



Figure 2: Lower limb strength training



Figure 3: Cardiopulmonary function training

2. Basic characteristics of EMS pulse impact system

2.1. Meet the diversified training needs of various groups

Athletes, rehabilitation population, obese population, lack of exercise time and other people, EMS training system can achieve the expected sports training effect efficiently and conveniently according to the different needs of trainers

2.2. Save time

Through EMS pulse impact, 20 minute fitness, including aerobic training, anaerobic training and intermittent training in the group, can achieve the effect of traditional fitness for 90 minutes, so as to save time and complete the expected effect of exercise.

2.3. Reduce joint pressure

In the traditional resistance training, through the large weight-bearing auxiliary training to increase the exercise intensity and achieve the exercise effect, but it will bring some pressure to the joints, and then increase the risk of sports injury. Some special people, such as rehabilitation people, can't bear great pressure on their joints. EMS pulse impact fitness training directly stimulates muscle neurons through external safe medical current, causing contraction of target muscle groups, which will not cause pressure on joints, greatly reduce the risk of injury caused by weight-bearing, and restrict the activities of patients with limited joint mobility, So as to promote the rehabilitation of sports injury.

2.4. Balance the muscle system

EMS can directly stimulate special muscle groups through special electrode patches and training coats, so as to balance body strength and improve the ability of injury prevention and control.

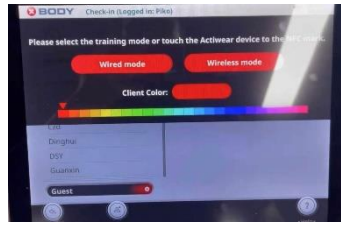


Figure 4: Wired or wireless connection mode

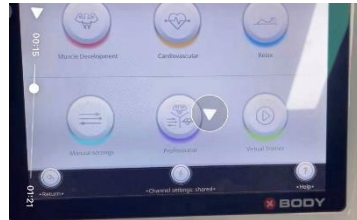


Figure 5: Mode selection



Figure 6: Setting of position and pulse value

3. Effects of EMS system on different populations

3.1. Professional athletes have long training years and heavy intensity load

Professional sports teams in various events in China generally practice twice a day or more. High intensity and high-frequency training will cause slight fracture or disorderly arrangement of muscle filaments, loss of muscle content, affect the growth of muscle volume, reduce the effect of excessive recovery, and seriously hinder athletes' training. The sports performance in the competition will increase the probability of injury, and even affect the improvement of athletes' self-confidence, greatly reduce the enthusiasm of athletes to participate in training and competition, and shorten the professional life of athletes. Therefore, athletes usually take a certain dose of protein products before and after training to reduce protein consumption in training. EMS training system is different from traditional training methods and has the characteristics of short-term efficiency. On the premise of ensuring the monitoring of athletes' physiological and biochemical indexes, EMS training system can be used to replace athletes' daily training, reduce athletes' energy consumption, muscle loss, reduce fatigue feeling, improve training efficiency in daily training and stimulate athletes' interest. According to the three basic modes of EMS, in the strength training mode, it can efficiently stimulate athletes' body muscles and reduce muscle consumption. At the same time, through the pre activation function of muscles, it can be used to warm up the training, fully mobilize the special target muscle function of the body, and improve athletes' sports performance during sports and competition; In cardiopulmonary function training, short-term muscle stimulation and cardiopulmonary training are used to increase athletes' vital capacity, reduce energy consumption per unit time, strengthen heart rate, increase load, reduce nerve fatigue, and strengthen myocardial function and oxygen supply capacity; In the relaxation mode, the conventional jogging acid removal mode will bring more energy consumption and increase the probability of injury under fatigue. The EMS training system can quickly and efficiently eliminate the accumulation of lactic acid after training, improve athletes' physical and mental fatigue, improve the training effect efficiently, conveniently, easily and safely, achieve the expected training objectives and improve training results and sports performance, Extend sports life.

3.2. Rehabilitated people

Due to the injury of muscles and joints, this kind of people is not convenient for some physical activities, is not conducive to the repair of the injury, and hinders the normal life and work. The data show that the injury rate of the population is as high as 20%. The body cannot efficiently complete the rehabilitation training in the case of injury. The conventional treatment methods for such rehabilitated people are rest, rehabilitation training, nerve block, surgery and other methods to restore the muscle strength level and return to normal life and work. However, exercise in the case of injury will cause local numbness and nerve transmission disorder due to self-protection, The movement is limited, which is easy to cause secondary damage. Different from the traditional sports rehabilitation methods, EMS electric pulse stimulation system is used to train the nerve and muscle function, enhance muscle strength, maintain and increase joint range of motion, and strengthen the autonomous control ability of muscle. Reduce the muscle fatigue and injury of rehabilitated people in sports rehabilitation training, stimulate the local part in a short-term and low load way, achieve the expected effect of rehabilitation efficiently and conveniently, restore normal work and life, and achieve the purpose of rehabilitation.

3.3. Obese people

for obese people, systemic EMS training can accelerate blood circulation, promote tissue metabolism, and promote blood lipid metabolism and insulin secretion through low-frequency pulses. Moreover, systemic EMS training can improve muscle recruitment. This EMS training technology can continuously keep the muscles in low and medium intensity contraction, consume more fat, inhibit fat synthesis, reduce the fat content of the whole body and improve the muscle mass. The data show that through 12 weeks of EMS training, you can lose an average weight of 5.98kg. In traditional weight loss, people often lose weight through exercise or diet control, but muscle or ligament damage is easy to occur in exercise weight loss. It is difficult for most people to persist in long-term high-intensity exercise, and there will be a rapid rebound after stopping exercise, At the same time, for some people with large weight base, exercise to lose weight will cause serious damage to their joints. In dieting and weight loss, people often adopt the extreme way of over controlling diet. The daily calorie intake is insufficient to the basic metabolism of the human body, resulting in physical malnutrition, decreased physical resistance and insensitive central nervous system. Anorexia, sexual changes, anxiety and other problems may occur. When the weight rebounds or remains unchanged, It will seriously attack the self-confidence of people who lose weight, and also lead to endocrine disorders, resulting in irritability and affecting their normal work and life. Compared with the traditional way of weight loss, EMS is more efficient and convenient for weight loss. It is applicable to a wide range of people and has no excessive requirements for body shape, so that people can achieve the weight loss goal in a relatively relaxed and comfortable state.

3.4. People with time constraints

for people with time constraints, at present, people's pace of life is relatively fast and life pressure is high. Most of their time is spent on work and study. There is little spare time for fitness exercise, but they still want to pursue strong physique and perfect muscle line. Most of the general exercise methods of these people are running or gym equipment exercise, However, traditional strength training can only exercise very local muscles at a time, and short-term training can not achieve the expected effect. It can only be achieved by spending a certain amount of time every day and adhering to it for a long time. However, systemic EMS training is to exercise 90% of the muscles of the whole body at a large intensity at the same time. It only needs 1 ~ 2 times a week, which is almost consistent with the training effect of traditional equipment 3 ~ 5 times a week, It is more time-saving and efficient. When the set fitness goal is reached, it can be maintained only by doing recovery training once a month. Compared with the traditional fitness exercise method, it can improve the fitness efficiency and solve the situation of no time, no persistence and no training effect.

4. Discussion and analysis

EMS muscle electrical pulse stimulation training system, its functional electrical stimulation is based on muscle electrical stimulation and combined with stimulation program to generate functional movement through wired or wireless Bluetooth. Its coverage area is five kilometers, which is mainly divided into three training modes: muscle strength training mode, cardiopulmonary function training mode and relaxation mode. Through efficient, safe and simple ways to achieve the expected training

objectives of different groups, for professional athletes, it can improve athletes' physical and mental fatigue, improve training effect, achieve the expected training objectives, improve training performance and sports performance, and prolong sports life; For rehabilitated people, it can reduce muscle fatigue and injury in sports rehabilitation training, stimulate local areas in a short-term and low load way, achieve the expected effect of rehabilitation efficiently and conveniently, restore normal work and life, and achieve the purpose of rehabilitation; For obese people, the goal of weight loss can be achieved in a relatively relaxed and comfortable state; For people with tight time, EMS training system can improve fitness efficiency and solve the situation of no time, no persistence and no training effect. EMS training system only needs 1 ~ 2 times a week, which can be consistent with the training effect of traditional instruments 3 ~ 5 times a week, so as to achieve the effect of reducing body fat, shaping, tightening skin and promoting cell metabolism. Under relaxed and comfortable conditions, there is no weight-bearing, no violent exercise, more comprehensive and in-depth activation of muscle cells, strengthen training and improve exercise efficiency. At present, at least five foreign EMS brands have entered China. The development prospect of EMS training system is broad, and it also points out the future development direction for physical training and rehabilitation.

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