**Electrical muscle stimulation as whole body training – Multicenter study on the use of full body EMS in fitness centers**

(VATTER, J., University of Bayreuth, 2003; publication AVM Verlag, Munich 2010).

## Aim of study

The objective of this paper was to discover whether positive changes with regard to strength, anthropometry, body awareness, mood, general health factors, back pain and incontinence can be realized through the use of electrically stimulated whole body training in a field test.

## Methodology

In four fitness centers, 134 volunteer subjects (102 women and 32 men) averaging 42.5 years of age were surveyed, tested and compared to a control group (n=10) and examined based on age and gender before and after six weeks of training. This involved a determination of maximum strength, physical endurance, body weight, body fat percentage, girth, frequency and intensity of back and incontinence complaints, as well as general complaint status, mood, vitality, body stability and body contouring. The 12 training units were carried out on a twice weekly basis with the following training parameters: pulse duration/interval 4 s/4 s, 85 Hz, rectangular pulses, pulse width 350 s. An approximately 25-minute training session with static exercise positions followed an habituation period totaling 10-15 minutes. The training session concluded with a five-minute relaxation program (pulse duration 1 s, pulse interval 1 s, 100 Hz, rectangular pulses, pulse width 150 s).

## Results

82.3% reduced their back pain, 29.9% were symptom-free afterwards. 40.3% complained about chronic pain beforehand and 9.3% after completion. 75.8% saw improvements in incontinence, and 33.3% were free of symptoms afterwards. The number of medical conditions was sharply reduced (about 50%). Maximum strength rose 12.2%, and muscular endurance 69.3%. Women benefited to a greater degree than men did (13.6% vs. 7.3%). 18 subjects ended the training prematurely. No changes were identified in the control group.

Body weight and BMI remained virtually the same. The body fat percentage fell 1.4% in the training group; it rose 6.7% in the control group. The younger persons undergoing the training lost more weight than the older; no gender- or weight-related variations resulted. Among the women in the training, the body circumferences were reduced significantly at the chest (-0.7 cm), thigh (-0.4 cm), waist (-1.4 cm) and hips (-1.1 cm). Among men, they decreased at the waist (-1.1 cm) with simultaneous growth at the upper arm (+1.5 cm), chest (+1.2 cm) and thigh (+0.3 cm). The control group showed no improvement and expanded at the waist and hips in the same time frame.

Body feeling improved, with 83.0 % exhibiting less tension, 89.1% greater stability, and 83.8 % higher performance. 86.8 % noticed positive body contour effects. 90.0% of the participants perceived the training positively. High intensities brought more significant improvements for the patients with complaints but increased the incidence of muscle aches.

## Conclusion

Whole body EMS training represents a persuasive method to reduce extremely common back and incontinence complaints. The increases in strength match the experience with conventional strength training and in some ways are even superior. The body contouring and mood aspects appeal to men and women at all age levels. Thus whole body EMS is an effective form of training appealing to a wide spectrum of target groups.