

Influence of adjuvant EMS training on body composition and cardiac risk factors in older men with metabolic syndrome

(KEMMLER, W. / BIRLAUF, A. / VON STENGEL, S., Erlangen-Nürnberg University 2009).

Aim of study

Sarcopenia and (abdominal) adiposity are closely associated with mortality, multi-morbidity and frailty in older people. The aim of this study was to determine to what extent whole body electromyostimulation (WB-EMS) training can influence body composition and cardiac risk factors in older men with metabolic syndrome.

Methodology

After randomization, a total of 28 men with metabolic syndrome according to IDF (69.4 ± 2.8 years) from the Erlangen area were assigned to a control group (CG: $n = 14$) or to a WB-EMS group ($n = 14$). The 14-week training WB-EMS regime provided a 30-minute endurance and strength program with the application of EMS every 5 days. In parallel, the control group underwent whole body vibration training focusing on "increasing flexibility and well-being."

The abdominal and whole body fat mass as well as the appendicular skeletal muscle mass (ASMM) were selected as the primary end points. Secondary endpoints were the parameters of the metabolic syndrome according to IDF (waist circumference, glucose, triglycerides, HDL cholesterol, systolic and diastolic blood pressure).

Results

At a high effect size (ES: $d = 1.33$), the change in the abdominal fat mass shows significant differences ($p = 0.004$) between WB-EMS and CG (-252 ± 196 g, $p = 0.001$ vs. -34 ± 103 g, $p = 0.330$). Parallel to this, whole body fat diminished by -1350 ± 876 g ($p = 0.001$) in the WB-EMS group and -291 ± 850 g ($p = 0.307$) in the CG (difference: $p = 0.008$, ES: $d = 1.23$). The ASMM also showed significant differences ($p = 0.024$, ES: $d = 0.97$) between the EMS group and vibration control group (249 ± 444 g, $p = 0.066$ vs. -298 ± 638 g, $p = 0.173$). With the exception of a significant inter-group difference ($p = 0.023$, ES: $d = 1.10$) for the waist circumference (EMS: -5.2 ± 1.8 cm, $p = 0.001$ vs. CG: -3.3 ± 2.9 cm, $p = 0.006$), no further effects on the parameters of the metabolic syndrome (see above) were shown.

Conclusion

At a low training volume (about 45 minutes/week) and a short period of intervention (14 weeks), whole body EMS training exhibits significant effects on the body composition of older persons. Thus WB-EMS could be an appropriate alternative to conventional training programs for people with low cardiac and orthopedic capacity.