Effects of whole-body electromyostimulation on resting metabolic rate, anthropometric and muscular parameters in the elderly. The training and electromyostimulation trial (test)

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

Objective
Especially women after menopause show serious changes of body composition with increasing abdominal body fat and a corresponding reduction of muscle mass. To counteract this development the whole-body electromyostimulation training (EMS) currently offers an alternative to conventional muscle training with a lower orthopedic and cardiac load and a comparing lower training volume. The aim of this pilot study was to identify the application and practicability of EMS training in the elderly plus to determine the efficacy of this training method on anthropometric, physical and muscular values.

Methods
30 postmenopausal women with long time training experience were randomized into a control group (CG: n = 15) and an EMS group (n = 15). While the control group continued with their usual training the EMS group performed a 20 minute whole-body EMS training every 4th day in addition to two strength and endurance training sessions per week. Alongside with the resting metabolic rate and VO2 the most important anthropometric data (body weight, body length, body fat, waist girth etc.) were determined.

Results
The resting metabolic rate showed significant reductions in the control group (-5.3 %, p = 0.038) and no changes in the EMS group (-0.2 %, p = 0.991). Despite medium effect size (ES: 0.62) these parameters showed only slight differences between EMS and control group (p = 0.065). The sum of skin fold thickness significantly decreased (p = 0.001) by 8.6 % in EMS group compared to a light and insignificant increase in control group (1.4 %). These differences were statistically significant (p = 0.001, ES: 1.37). Waist girth as a criterion for abdominal obesity significantly decreased (p > 0.001) by -2.3 % in the EMS group (vs. CG: +1.0 %, p = 0.106). The corresponding difference between the groups was significant (p = 0.001, ES: 1.64).

Conclusion
In summary, besides health relevant effects on body composition the present study also revealed enhancements of functional parameters such as maximal strength and speed strength. Furthermore, the analysis identified a high acceptance of EMS training in the well trained postmenopausal women. Accordingly, this training form, besides efficacy, seems to also ensure practicability.