EFFECTS OF MICROCURRENT THERAPY WITH RESISTANCE EXERCISES ON STRENGTH, FUNCTIONAL CAPACITY, AND MUSCLE THICKNESS IN MIDDLE-AGED ADULTS: A PILOT STUDY

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INTRODUCTION

Microcurrent therapy (MCT) is a non-invasive method that transmits a sub-sensory electrical current through the skin within the range of milliamperes (1-999mA). In addition to resistance exercise, MCT has been suggested as a non-invasive, effective therapy for sarcopenia. The aim of this study was **to analyse the effects of adding MCT to a resistance exercise programme** on strength, functional capacity, and muscle thickness in middle-aged adults (40-65 years).

METHODS

The study involved a double-blind, randomised controlled design. Eight participants (mean ± SD: age 54.4 ± 7.4 years, BMI 23.1 ± 3.8 kg/m^2, height 168.7 ± 12.3 cm) were randomly assigned into a **microcurrent** (MCT, n = 4; 1 man and 3 women) or a **sham** (SH, n = 4; 1 man and 3 women) group.

All participants completed a **6-week resistance training programme** with elastic bands (2 sessions per week, 12 workouts). Participants performed 3 sets of 12 to 15 maximal repetitions, with 1.5 to 2 min of rest between sets, of the following exercises: shoulder press-squat, biceps curl, back squat, lateral pull down, deadlift, triceps extension, lunge, and upright row (Figure 1).

Fig. 1. Training programme with resistance bands for middle-aged adults.

The rating of perceived exertion (RPE) was determined by the OMNI-Resistance Exercise Scale (OMNI-RES) for elastic bands (0-10 scale) to determine the increment of the training load over the 6-week intervention period. An RPE of 6 to 7, 7 to 8 and 8 to 9 rated immediately after the completion of each set was required during weeks 1, 2, and 3 to 6 respectively. If participants did not reach the required RPE after 12 reps, they were instructed to (i) increase the number of reps up to 15 and (ii) if this was not enough for obtained the wanted RPE, they had to increase the resistance offered by the elastic band by reducing its grip width or changing it to a less viscoelastic band.

Participants wore a **microcurrent** or a sham device on their dominant upper-arm during the **3 hours** immediately after the workout or in the morning on non-training days. The device delivered a current with an intensity between **50 to 400 µA** in a ratio of 2:1 (on:off) and a frequency of 1 kHz.

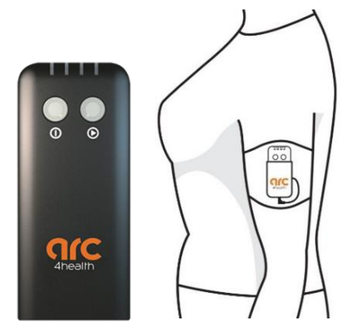

Fig. 2. Microcurrent device Arc4health.

Measurements of **strength** (handgrip and 90° isometric leg press), **functional capacity** (30s chair stand test), and **muscle thickness** were conducted before and after the intervention. Pre-post changes were analysed to calculate effect sizes.

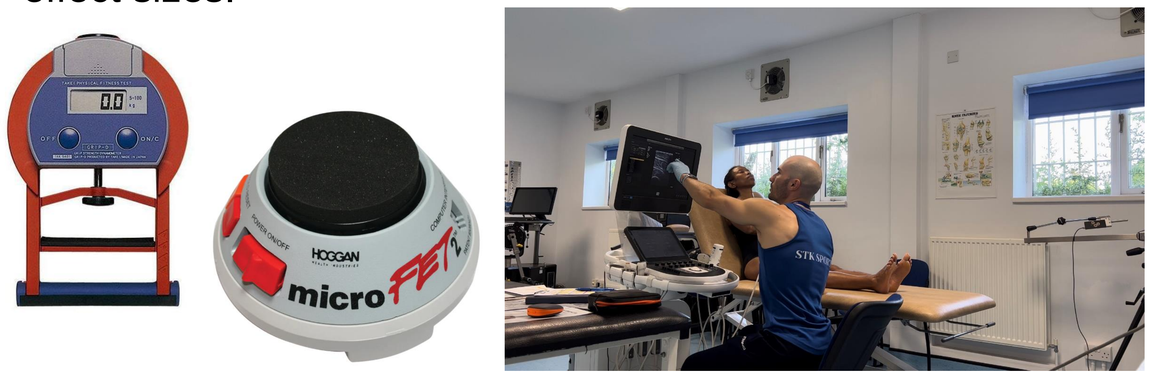

Fig. 3. TKK, microFET2 dynamometers, and Affiniti 50 Ultrasound system .

RESULTS

A significant increase in the post-assessment 90° isometric leg press test was determined in the **MCT group** (+3.9 kg, p = 0.03, d = -1.85). No other significant, pre-post or between-group differences were observed. Nonetheless, compared to SH, the **MCT group showed more favourable effect sizes** in 90° isometric leg press (d = -1.20), handgrip strength (d = 0.66), 30s chair stand test (d = -0.99), and vastus lateralis muscle thickness (d = -0.68).

CONCLUSION

Adding a 3-hour post-workout **microcurrent treatment appears to favour** resistance training outcomes in middle-aged adults.