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4 - 7 July 2023, Paris, France

Hosted by: INSEP French Institute of Sport

BOOK OF ABSTRACTS

Edited by:

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ISBN 978-3-9818414-6-6



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European College of Sport Science:

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ISBN 978-3-9818414-6-6

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Conception, DTP: SporTools GmbH – Data management in sports

Corrections: Patera, K., Tsolakidou, A., Tsolakidis, S.

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hancement in the coronary artery contraction in the Old group, and this effect was restored after 11 weeks of aerobic exercise training in aging rats. Furthermore, SOCE-mediated coronary contraction in Old group was significantly higher than that in the Young group, and this effect was significantly inhibited by exercise training in aging rats. Our immunohistochemical results showed that, the expression of Orai2 was abundant in myocardium and coronary smooth muscle layer. Compared with Young group, the expression of Orai2 protein in Old group and Old+Exercise group was significantly lower. Additionally, the expression of Orai2 in Old+Exercise group was significantly lower than that in Old group. The expression of Orai3 protein in Old group was significantly lower than that in Young group, and the expression of Orai3 in Old+Exercise group was higher than that in Old group. The expression of STIM1 in Old group and Old+Exercise group was significantly lower than that in Young group, and the expression of STIM1 in Old+Exercise group was higher than that in Old group. However, the expressions of Orai1 and STIM2 in the smooth muscle layer of coronary artery were low. High throughput sequencing of rat serum was executed and a total of 114 different expressions of microRNAs was found, in which rno-miR-298-5p was the target microRNA of Orai2, novel_miR_1079 was the target microRNA of STIM1, and rno-miR-27a-5p was the target microRNA of STIM2 and Orai3.

CONCLUSION: Aerobic exercise can effectively improve the abnormal enhancement of coronary artery contraction induced by aging, which is related to the down-regulation of SOCE-related proteins Orai and STIM. The microRNAs may be involved in the regulation of the expression of Orai and STIM. Among them, rno-miR-298-5p, rno-miR-27a-5p, and novel_miR_1079 are potential target microRNAs of Orai and STIM.

THE EFFECT OF 10WEEK FOREST WALKING EXERCISE ON KNEE STABILIZATION IN MIDDLE-AGED FEMALE

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INTRODUCTION: The purpose of this study was to compare the indoor resistance exercise group using elastic bands and the forest exercise group using forest slopes for middle-aged female in order to investigate the effect of walking exercise on muscle strength improvement in forest environment.

METHODS: Twenty-four female were randomly assigned to an indoor group (n=11, mean±SD: age 53.38±10.78 years, height 160.54±4.99cm, body mass 61.71±5.69kg) and a forest group (n=13, mean±SD: age 56.73±7.06 years, height 162.55±4.55cm, body mass 63.14±10.04kg). In the indoor group, the exercise was performed mainly on the lower extremity using an elastic band, and the forest group performed a walking exercise to uphill and downhill the sloping forest environment. Both groups were carried out twice a week for a total of 10 weeks. The RPE intensity was gradually increased to 13-14 intensity for the first 1-2 weeks, 15-16 intensity for 3-6 weeks, and 16-17 intensity for 7-10 weeks. Before the start of exercise and after the end of the exercise period, Biodex System 4 was used to perform left and right extension and flexion at 60°/sec speed five times in total, and the knee strength measured at 30° was analyzed by Two-way mixed design ANOVAs. If there was a significant difference, it was post-hoc by the bonferroni method.

RESULTS: There was no significant difference in right extension according to group and time (group: p=.827, Time: p=.813), and there was no interaction effect (p=.111). There was no significant difference in the right flexion according to the group (p=.789), but there was a significant difference according to the time (p=.027), and there was an increase in the forest exercise group (p=.020). There was no significant difference in left extension (p=.281), significant difference in time (p=.002), and increased in forest exercise group (p=.005), and no interaction effect (p=.507). There was no significant difference in the left flexion according to the group (p=.476), and there was a significant difference according to the time (p=.000), and both the indoor exercise group (p=.007) and the forest exercise group increased (p=.002). There was no interaction effect (p=.833).

CONCLUSION: Walking exercise in forest environment is thought to have brought improvement of knee muscle strength by giving load to uphill and downhill lower extremities, and it was confirmed that forest walking exercise can be suggested as an activity to improve muscle strength for middle-aged female knee stabilization.

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). MCT has been suggested as an effective treatment 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.

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/m², 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. 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 microcurrent device delivered a current with an intensity between 50 and 400 μA in a ratio of 2:1 (on:off) and a frequency of 1.03 kHz. 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.

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-hr post-workout microcurrent treatment appears to favour the positive effects of resistance exercise in middle-aged adults.

IMPROVEMENT IN FUNCTIONAL, CLINICAL SCORE AND QUALITY OF LIFE AFTER A SPECIFICALLY DESIGNED EXERCISE PROGRAM IN PEOPLE WITH TOTAL HIP REPLACEMENT: A PILOT STUDY

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INTRODUCTION: Hip osteoarthritis (OA) are highly prevalent age-related chronic condition among older people. The end-stage treatment for OA is the total hip replacement (THR). Despite the high impact of physical activity and an active lifestyle on peoples quality of life (QoL) and joint health, the majority of people remain inactive, especially those who suffer from osteoarthritis. The aim of this study was to improve the clinical and functional status of people who have undergone THR as well as their QoL through a specifically designed exercise program

METHODS: A cohort of 10 patients (mean age of 64.1 ± 7.9) was enrolled for participating in the study. The patients were recruited at Rizzoli Orthopedic Institute at the moment of the pre-surgery medical check-up. The participants were randomly assigned to the intervention Group (IG) or control group (CG). The IG followed a 3-month exercise program specifically designed for people with hip arthroplasty. The CG followed the usual care for such patients. Both groups were assessed three times: within 2 weeks pre-surgery (PreSA), 6 months after surgery (PostSA), and after the 3-month exercise (3MA). The outcomes assessed were: Health-related Quality of Life (SF-36 questionnaire), functional (Timed up and go, 30sec chair stand test, single leg stance test) and clinical outcomes (WOMAC and HOOS), strength parameters (handheld dynamometer), and joints mobility. The Student's t-test for unpaired samples was used for parametric quantitative variables and the Chi-square test for qualitative dichotomous ones. A post-hoc analysis with Bonferroni correction was used for the comparison between groups and between the assessment time. The significance level was set at $p < 0.05$

RESULTS: From the initial cohort of participants, 2 of the control group dropped out. Hence, 8 participants completed the assessments (3 in IG and 5 in CG). In the IG group, the "physical function" domain of SF-36 showed statistically significant improvement from PreSA to PostSA ($p < 0.01$) and 3MA ($p < 0.01$). Concerning the strength assessment, the IG showed a significant improvement in hip extension strength from PreSA to 3MA ($p < 0.05$), while the GC showed no significant improvements in strength parameters. Regarding the functional tests, the IG showed a significant improvement in TUG from PreSA to 3MA ($p < 0.01$). The other outcomes showed improvement in both groups from PreSA to PostSA and 3MA, however, they were not statistically significant ($p > 0.05$).

CONCLUSION: The overall clinical and functional score and QoL parameters improved from the first (PreSA) to the last evaluation (9 months after surgery). However, the IG showed greater improvement in lower limb strength, reduced risk of falls (measured through TUG), and higher self-reported physical function (SF-36) than the CG. Interventions based on exercise programs specifically designed for people with THR have the potential to improve the quality of life of these individuals.

ESTROGEN-TREATED POSTMENOPAUSAL WOMEN HAVE INCREASED MUSCLE MITOCHONDRIAL RESPIRATORY CAPACITY AND THIS IS ENHANCED BY ACUTE EXERCISE

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INTRODUCTION: Estrogen is recognized to exert a protective effect on mitochondrial function, by mediating processes as mitochondrial biogenesis and antioxidant defenses against free radicals. Likewise, loss of estrogen is associated with decreased mitochondrial respiratory capacity (MRC) in rodents [1]. Since menopause causes a rapid decline in circulating estrogen this on-going study investigated if mitochondrial function was affected by estrogen-treatment in postmenopausal women. It was hypothesized that estrogen-treated postmenopausal women showed superior mitochondrial function than non-treated women.

METHODS: Biopsies from vastus lateralis were obtained from 11 hormone-treated (HT) postmenopausal women (55 ± 4 years, BMI: 22 ± 2 kg/m², VO₂max: 36.9 ± 5 ml/kg/min) and 10 non-treated controls (C) (55 ± 6 years, BMI: 23 ± 2 kg/m²,

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ISBN 978-3-9818414-6-6