C-40 Free Communication/Poster - Cold/Hyperbaric/Diving Physiology

Thursday, May 30, 2019, 7:30 AM - 12:30 PM
Room: CC-Hall WA2

1456 Board #218 May 30 9:30 AM - 11:00 AM
Circulating Mcp-1 During And Following Prolonged Cycling In Cold Temperature
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(No relationships reported)

RESULTS: The purpose of this study was to examine the impact of aerobic exercise in a cold condition on the recruitment of classical monocytes (CD14++CD16-). METHODS: Six recreationally active men (24.7±3.9 yrs; 182.3±6.9 cm; 85.7±12.8 kg; 3.7±0.3L·min⁻¹) completed three experimental conditions; a VO2max test, and a cycling protocol in 9°C/55% Relative Humidity (RH)/LTLH, and 24°C/58%RH (MTMH). The exercise session consisted of 60-min cycling at 60% VO2max, 15-min rest, and a time to exhaustion at 90% VO2max (TTE). Blood samples were obtained before (PRE), after 60-min of cycling (60), after TTE (90) and after 1-hour of recovery (REC). Blood was analyzed for plasma concentration of Monocyte Chemotractant Protein 1 (MCP-1) via ELISA, and the expression of MCP-1 receptor (CCR2) on classical monocytes and assessed by flow cytometry. Expression was determined based on fold changes in fluorescence minus one (FM0). Data were analyzed using within-subjects repeated measures ANOVA.

RESULTS: No interaction (F = 2.3; p = 0.128; n² = 0.251), main effect for time (F = 1.9; p = 0.202; n² = 0.09) nor main effect of condition was observed (F = 0.13; p = 0.727; n² = 0.018) for circulating MCP-1. No interaction (F = 1.7; p = 0.251; n² = 0.249) was observed for CCR2 expression on classical monocytes, however, a main effect for time (F = 31.2; p = 0.002; n² = 0.862) was observed. CCR2 expression was maintained from PRE (124.4±37.1) to 60 (124.4±91.2, p = 0.068), before decreasing at 90 (124.4±36.8, p = 0.001) and REC (86.4±25.2, p < 0.001).

CONCLUSION: This data indicates that prolonged cycling in cold temperature may reduce the recruitment of classical monocytes, evident by reduced CCR2 expression. This may indicate a suppression of classical monocyte recruitment during exercise in moderate and cold temperatures. Further research is warranted to assess these responses at greater intensities or duration.

1457 Board #219 May 30 9:30 AM - 11:00 AM
Effects Of Cooled Compression Exercise Technology On Health, Sleep, And Quality Of Life In Veterans.
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(No relationships reported)

Veterans are disproportionately affected by physical and emotional functional disorders compared to their civilian counterparts, a discrepancy that is deepened by delay to care within the Veterans Health Administration. Research has supported use of compression exercise in physically limited populations and demonstrated physiological responses at lower intensities (10-20% one repetition maximum vs 70% for hypertrophy in resistance exercise). Combination of low-pressure compression exercise and cooling has shown elevated growth hormone and testosterone and depressed nighttime cortisol, indicating this may be beneficial for addressing emotional and sleep dysfunctions.

PURPOSE: To determine the safety and efficacy of an accessible cooled compression exercise system on markers of physical and emotional function in veterans.

METHODS: 14 veterans completed 24 sessions in 12 weeks. Baseline and endpoint questionnaires validated for clinical significance were administered to determine sleep quality (Pittsburgh Sleep Quality Index), quality of life (RAND Short Form 36), and respiratory dysfunction related to stress and anxiety (Nijmegen Questionnaire).

RESULTS: Two-tailed T-tests were performed on the data. Sleep quality improved in 71% of subjects (t9.1846.87 vs 5.5743.74, p = 0.0232), 57% improved quality of life (73.45±17.17 vs 84.46±9.27, p = 0.0316), and 71% decreased adverse respiratory symptoms (11.29±9.38 vs 7.86±6.26, p = 0.0594) compared to baseline. Increases were seen in all 8 sub-scores of quality of life, with statistically significant improvements in social functioning (75.28±17.17 vs 94.64±11.62, p = 0.0058), energy and fatigue (48.93±25.21 vs 65.63±19.26, p = 0.0426), emotional wellbeing (66±24.29 vs 85.14±14.16, p = 0.0054), and general health (72.14±17.58 vs 79.64±12.78, p = 0.0497). For sleep quality, those subjects with baseline scores defined as clinically disturbed sleep (n=8, 58%) all (100%) experienced sleep improvements (9.14±6.87 vs 5.57±3.74, p = 0.00301), with 25% resolving below clinical delineation.

CONCLUSION: These findings suggest that the combination of cooling and compression exercise may be an effective intervention method to address symptoms in veterans and other individuals living with insomnia, post-traumatic stress, chronic fatigue, and depression.

1458 Board #220 May 30 9:30 AM - 11:00 AM
Whole-body Cryotherapy: Case Series Of Sleep, Pain And Anxiety In Healthy Individuals
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BACKGROUND: Whole-body cryotherapy (WBCT) takes place in an enclosed chamber at -184 degrees Fahrenheit. WBCT is currently used to alleviate inflammation and pain in arthritis and osteoarthritis and for pain relief in fibromyalgia. However, to date, only anecdotal evidence exists on the benefits of cryotherapy to provide deep, restful sleep.

PURPOSE: The purpose of this case series was to test the hypothesis that WBCT would have a positive impact on sleep, pain levels and anxiety of healthy individuals.

METHODS: Surveys regarding sleep, pain levels and anxiety were administered before and after 10 WBCT sessions (max 3 minutes) to five participants (Age > 50). Sleep was assessed using the Pittsburg Sleep Quality Assessment Index (PSQI). Pain was assessed using the Borg Rate of Perceived Pain Scale, and anxiety was assessed using the Hamilton Anxiety Scale.

RESULTS: One male (Age 74, BMI = 30.7 kg/m², Caucasian) and one female (Age 73, BMI = 24.9 kg/m², Caucasian) presented with pain from arthritis and while the WBCT had no impact on sleep or anxiety, their pain was reduced from moderate/strong pain (Borg = 4) to extremely weak pain (Borg = 0.5) and from moderate/strong pain (Borg = 4) to weak/moderate pain (Borg = 2.5), respectively. One female (Age 52, BMI = 24.0 kg/m², Caucasian) presented with stress/anxiety and sleep problems. Her pain improved from moderate (Borg = 3) to very weak (Borg = 1), her sleep quality improved by 12 points on the PSQI and her anxiety score improved by 18 points on the Hamilton anxiety scale. Finally, two females (Age 65 and 72) both had no specific reason for trying the WBCT. Both demonstrated no changes in pain, sleep, or anxiety.

CONCLUSION: These five cases demonstrate that WBCT can improve pain if the subjects present with moderate (or greater pain) and that WBCT may be able to improve sleep and anxiety in subjects that present with problems with sleep or anxiety. Future research is needed in larger samples of people with a history pain, anxiety and/or sleep issues to continue to test the hypothesis that WBCT may have a positive impact on sleep, pain levels and anxiety.

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