

Aerobic exercise for treatment of Chronic symptoms following mild Traumatic Brain Injury (ACTBI): A randomized controlled trial

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Introduction: Following mild traumatic brain injury (mTBI) up to 30% of adults will continue to experience persistent post-concussive symptoms (PPCS), including exercise intolerance, greater than one-month post-injury. While aerobic exercise programs in adolescents have been shown to speed up recovery post-injury, a similar intervention has not been studied in adults with PPCS.

Methods: Participants (18-65 years) with PPCS (>3 months-5 years) were randomized to a 6-week aerobic exercise program (AEP) or stretching program (SP). Participants performed either aerobic or stretching activities 5x/week for 30 minutes while wearing a heart rate (HR) monitor for the duration of the program and logged activity in a daily diary. The Buffalo Concussion Treadmill Test (BCTT), a measure of exercise intolerance, was used to assess HR at point of symptom exacerbation. Prescription target HR for the aerobic exercise was 80% of max achieved on the BCTT and was updated every 3 weeks. Individuals who started with the 6-week AEP continued for an additional 6-weeks (12-weeks total) and individuals who started with the 6-week SP, continued onto the AEP (18-weeks total). Symptom and quality of life questionnaires, in addition to 5 nights of sleep actigraphy were completed every 6 weeks. HR variability and baroreceptor sensitivity were assessed every 6-weeks. Blood samples were also collected every 6 weeks for analysis of inflammatory and central nervous system biomarkers.

Preliminary results: Fifty-two participants (mean age: 43.0 ± 10.9 ; 75% females; mean months since injury: 25.2 ± 14.1) were recruited. Mean baseline Rivermead Post Concussion Symptom Questionnaire score was 35.3 ± 9.7 (out of 64), indicating a high degree of symptom burden. Mean baseline stage reached on the BCTT was 8.5 ± 4.1 , indicating a high degree of exercise intolerance.

Conclusion: This trial has the potential to inform treatment for individuals with PPCS and understand the mechanisms by which exercise may improve symptoms and exercise intolerance.