



16th Annual Brain Injury Conference

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Poster #: 15

Abstract Title: Investigating the Feasibility of a Submaximal Resistance Exercise Protocol in Recovery of Patients with Persistent Concussion Symptoms via a Mobile Health(mHealth) Intervention.

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ABSTRACT:

Abstract Theme: Mild TBI / Concussion

Topic(s) of Interest: Clinical Interventions

Purpose of Project: This study sought to assess a novel modality for exercise prescription via natural-environment, remotely delivered, sub-maximal resistance exercise for patients with persistent post-concussion symptoms. The assessment of success/efficacy of the exercise delivery is described in the collection of expanded panels of symptomology including symptoms of concussion, anxiety, and depression.

Methods, Procedure, Results/Outcome, Conclusion: This prospective single-cohort study describes responses to a novel exercise protocol delivered via mobile application for patients with persistent concussion symptoms. Participants signed up for the mobile health application and completed onboarding for collection of demographic information and symptomology. Participants were assigned a personalized rehabilitation plan and were encouraged to complete 3-sessions of the personalized plan per week for the duration of the study. Symptom reassessment occurred at study onboarding and following completion of the 4-week intervention. The following outcome measures were collected. Concussion Symptoms: (22 items from the Sport Concussion Assessment Tool (SCAT-5) + 7 additional vision and balance-related questions), The Patient Health Questionnaire (PHQ-9) for depression symptoms. Generalized Anxiety Disorder (GAD-7) for anxiety symptoms. Application demographics and engagement metrics.

Statistical analysis: The analysis of this data was conducted using Bayesian indexed linear modelling. Bayesian analysis is advantageous due to the ability to incorporate domain-specific knowledge about model parameters. Using informed priors constrain estimates to scientifically possible values. Models were built to estimate the value of symptom scores between time points using Markov Chain Monte Carlo (MCMC) simulation. This process allows the user to have an estimate the parameter's value as well as the uncertainty around these estimates.

Results: 80 participants were recruited and completed the intervention and all assessment time points. This sample contained a majority female (n=68, male; n=11, nonbinary; n=1). Participants had mean age of 38.34 (sd=12.3). Participants' median time from injury was 1009.5 days (IQR: 1277.4 days). The cohort was moderately symptomatic via SCAT-5 (mean=42.98 SD= 19.94), PHQ-9 (mean=9.59, sd= 5.53) and GAD-7 (mean=6.83, SD=4.39). Model expectations in SCAT-5, PHQ-9 and GAD-7 symptoms occurred with a posterior probability of 99.6% (mean -8.45 with CI90 = -14.01: -3.70), 99.7 % (mean = -2.06 with CI90 = -3.26 : -0.75 pp 99.7% < 0). 88% respectively (mean = - 0.80 with CI90 = -1.87 : 0.28, pp 88% < 0).

Future directions: This exploration of a new modalities for exercise prescription following concussion will enhance options and access for mTBI patients. Complete analysis is still under way and will be presented at the conference.