There has been a shift in paradigm from “rest is best” to early return to physical activity in the initial stages following a mild traumatic brain injury (TBI). The most recent consensus statement recommends undertaking light intensity physical activity within 24 to 48 hours post-injury and exercise testing within two to 10 days post-injury. Additionally, much of the current evidence on exercise testing and exercise intervention post-mild TBI has been conducted in the acute, young and athletic population, for return-to-sport purposes. This limits generalisability to other populations and purposes. This thesis aims to assess and guide the return to physical activity in the general population with persistent symptoms following a mild TBI.

The thesis includes a series of studies including a systematic review with meta-analysis (Chapter 3), retrospective clinical audit (Chapter 4), prospective observational study (Chapter 5), survey study (Chapter 6), and qualitative study (Chapter 7).

The findings support the use of subthreshold (i.e., exercising below the threshold heart rate (HR) achieved on exercise testing) aerobic exercise for improving persistent symptoms, especially when incorporated as part of a more comprehensive intervention involving multiple modals and disciplines. This allows multiple symptoms to be targeted to enhance management of symptoms.

The findings also support the use of the Buffalo Concussion Treadmill Test (BCTT) for identifying physiological dysfunction. The inability of an individual to reach 90% of their age-predicted maximum HR indicates physiological dysfunction following a mild TBI. The test can also be used for reassessment; the closer an individual gets to 90% of their age-predicted maximum HR, the more it suggests they are nearing physiological recovery. Other measures of the BCTT such as test duration, HR recovery and perceived exertion should be interpreted with caution, as they are influenced by baseline levels of physical activity and mental health status.

Results suggest that following a mild TBI, physical activity levels are reduced, and participants experience several barriers and facilitators that influence their return to physical activity. Most notably, there was a pattern of poor mental health affecting the performance on the BCTT and recovery of symptoms. Understanding these factors could enhance clinical intervention and inform strategies to maximise recovery.