

CONCUSSION CHRONICLES

Earlier time to aerobic exercise is associated with faster recovery following acute sport concussion

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INTRODUCTION

Historically, concussion guidelines have recommended strict rest following injury followed by a gradual return to physical and athletic activity.⁽¹⁾ Complete rest until asymptomatic status has been shown to be an ineffective management strategy that may exacerbate and prolong symptoms.⁽²⁾ In 2010, researchers at the University of Buffalo began demonstrating the benefits of controlled, sub-symptom threshold exercise on patients with protracted concussion recovery.⁽³⁾

This evidence has continued to build over the past 8 years with shorter and shorter timelines for exercise implementation. Introduction of aerobic exercise early in the acute post-concussion phase has recently been found to be safe and not to delay recovery in any way.⁽⁴⁾ In fact, Grool et al., in 2016 found that children and adolescents who engaged in self-selected aerobic exercise within the first 7 days after injury had reduced risk of suffering from persistent concussion symptoms versus those who did not engage in early aerobic exercise.⁽⁵⁾

The current study under review sought to examine the effect of time to initiation of aerobic exercise on the time to recovery following acute concussion.

Would starting exercise even earlier than 7 days produce a better or worse effect on concussion recovery?

METHODS

A retrospective analysis on physician-diagnosed, acute (within 14 days or less) sport-related concussions over a period of 14 months. The main variable of interest was the number of days from injury to the **initiation** of aerobic exercise – the researchers included both “self-initiated” meaning the athlete took it under their own direction to start exercising without the advice of a medical professional, and exercise that was recommended by the sport-medicine physician.

Physician prescribed exercise followed a specific protocol (15 minutes, 100-120 beats per minute heart rate, followed by a progression in both time and intensity); however, self-initiated exercise did not (limitation to the study).

The main outcome of interest was the number of days from the injury until full return to school and full return to sport as cleared by the sport-medicine physician.

Statistical calculations included propensity scores to account for confounders (age, sex, symptom severity score, time to first assessment, etc.), as well as a survival analyses to determine the association between time to aerobic exercise and time to full return to school and sport.

KEY FINDINGS

- 253 concussions (148 males) were included (mean age = 17.0 year (range 15-20) 49.8% reported no previous concussions
- Majority of injuries occurred in Ice Hockey (24.9%), Rugby (12.3%), Football (11.5%), and Soccer (8.7%)
- **“For each successive day in delay to initiation of aerobic exercise, individuals had a less favourable recovery trajectory.”**
 - **Initiating exercise on day 3** = 36.5% reduced probability of faster full return to sport and 45.9% reduced probability of faster full return to school/work compared with initiating aerobic exercise on day 1
 - **Initiating exercise on day 5** = 59.5% reduced probability of faster full return to sport and 70.5% reduced probability of faster full return to school/work compared with initiating aerobic exercise on day 1
 - **Initiating exercise on day 7** = 73.2% reduced probability of faster full return to sport and 83.1% reduced probability of faster full return to school/work compared with initiating aerobic exercise on day 1
 - **Initiating exercise on day 14** = 88.9% reduced probability of faster full return to sport and 94.7% reduced probability of faster full return to school/work compared with initiating aerobic exercise on day 1

DISCUSSION & BIASES

This important study builds on our understanding of concussion recovery and how prolonged rest may be detrimental. As evidenced by the above findings, initiating exercise earlier in the recovery process may actually have a protective effect for athletes with sport-related concussion.

Exercise has been shown to be beneficial in a number of musculoskeletal and neurological conditions. It should be no surprise that we are continuing to see an emergence of literature in this area to support this notion with concussion as well. Because of the metabolic nature of concussion, exercise seems counter-intuitive to concussion recovery, which is likely why we have taken so long to accept this concept despite the overwhelming amount of supportive literature.

This study has several limitations which should be taken into consideration:

1. Retrospective analyses have inherent limitations
2. Some athletes self-selected their exercises – no indication as to intensity, duration, type, etc.
3. Although attempted to be accounted for in the statistical calculations, athletes who initiate exercise earlier may have had less severe injuries to begin with and therefore were more likely to feel up to participating in exercise earlier on and also having a faster recovery

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