Evaluating Concentrated Oxygen Use for Acute Concussion Symptoms & Return to Play in Collegiate Athletes

Cody Schramm[1], Tyler Harris[2], & Kyle Petit[3] [1]University of Michigan, [2]Adrian College, [3]UW Oshkosh

INTRODUCTION

Concussion results in disrupted autoregulatory response to carbon dioxide levels, potentially compromising cerebral blood flow by 50% (Choe, 2016; Giza & Hovda, 2014). This comes during an increased demand for energy, creating an energy crisis as the brain attempts to heal and restore homeostasis. Such outcomes have been associated with severity of concussion symptoms, particularly with physical exertion.

Hyperbaric oxygen therapy and normobaric hyperoxia therapy have received interest as effective treatments for traumatic brian injury (Kumaria & Tolias, 2009). However, these therapies are not always accessible or feasible in a clinical setting. Commercially available portable concentrated oxygen may provide an affordable, convenient alternative to other forms of oxygen therapy, but research on this product is limited.

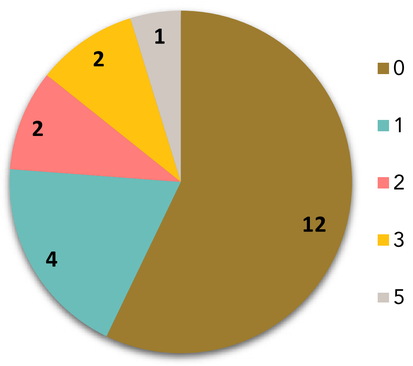
The PURPOSE of this study was to examine the effects of portable concentrated oxygen on acute concussion symptoms and return to play (RTP) time in collegiate athletes.

METHOD

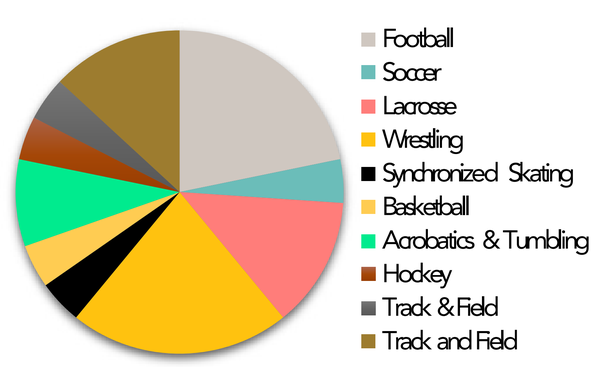
PARTICIPANTS

23 Collegiate Athletes *M* age = 19.3 (*SD* = 1.2) 12 Females

# of Previous Concussions



Sport



PROCEDURE

Day 0
Day of Concussion Injury
Control = 10 Oxygen = 13

Within 2 Days
Informed Consent
Certified athletic trainer (ATC) provided canister and instructions if in oxygen group

Day 0 Until RTP
Daily Symptom Checklist
Oxygen group: Use canister for one minute, thrice daily, until the canister emptied

RTP
Return To Play – Cleared by Physician
Researchers received anonymous medical records from ATC

DISCLOSURE

Unlabeled portable concentrated oxygen canisters were provided by Boost Oxygen, but there was no other involvement in the research.

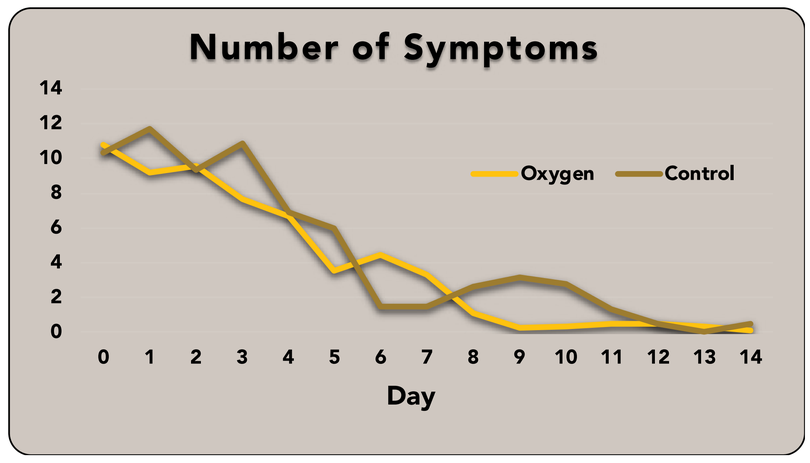
Placebo control was not possible, as no canisters were provided with ambient air.

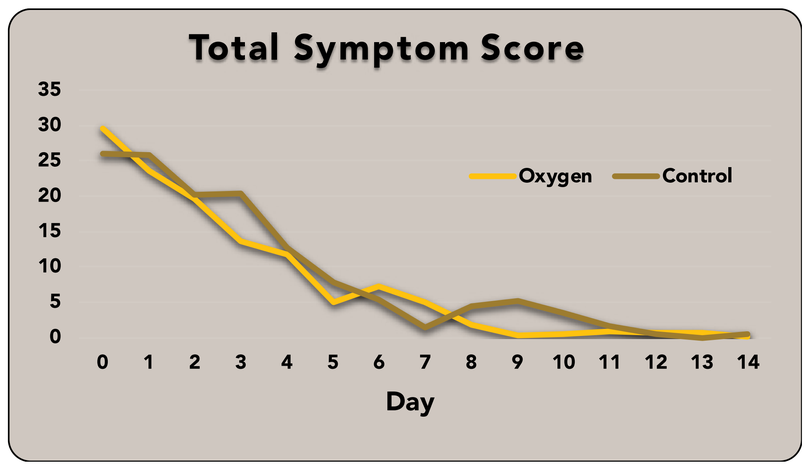
RESULTS

RETURN TO PLAY

Group averages showed RTP was nearly five days faster for the oxygen group (15.00±5.86 days vs. 19.80±11.50 days), but the T-test revealed this difference was not statistically significant, p = .205.

SYMPTOMS





The difference between groups on number of symptoms and total symptoms score was nearest to significance on days three (symptoms: p = .272, total score: p = .232) and five (symptoms: p = .175, total score: p = .254). Coincidentally, the average days of canister use was three.

DISCUSSION

This small-scale study suggests feasibility of concentrated oxygen as an intervention for concussion in regard to acceptability, implementation, and limited-efficacy testing. While statistically signficant differences were not found between the oxygen and control groups, this may have been due to study limitations:

- Small sample size.
- Medication use, which may affect symptom severity, was not recorded.
- Symptom checklists and RTP may not have been completed during weekends or academic breaks.
- Participants were not monitored for specifically how they used the canisters.

Therefore, this modality requires further examination using a larger sample. Ideally, the symptom checklist would be from a common measure such as the SCAT 6 to allow for multiple institutions to be considered. Furthermore, canisters filled with ambient air for the control group would mitigate any placebo effects.

Additional research could establish the clinical relevance of canister oxygen during concussion recovery, determining whether it is a viable alternative to hyperbaric or normobaric oxygen therapy.

References

Choe, M. C. (2016). The pathophysiology of concussion. *Current Pain and Headaches Reports, 20*(6), 42.
Giza, C.C., & Hovda, D. A. (2014). The new neurometabolic cascade of concussion. *Neurosurgery, 75*, S24-S33.
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Sport Performance & Injury Research Laboratory
University of Wisconsin Oshkosh

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