Attentional and Saccadic Deficits Following Concussion

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INTRODUCTION

Concussion may lead to a number of cognitive, attentional, and sensorimotor deficits. However, these deficits are typically examined in isolation. The goal of the present research was to characterize the relationship between attentional and oculomotor dysfunctions following concussion and examine how this relationship evolved during the first month following the insult.

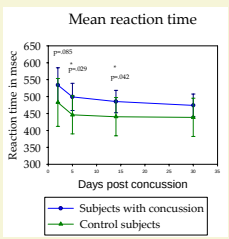
METHODS

Participants:	12 Subjects with concussion 7 Control subjects
Testing schedule	2 days, 5 days, 2 weeks, and 1 month post injury
Assessment tools:	Attentional Networking Test (ANT) Saccade gap paradigm

ANT

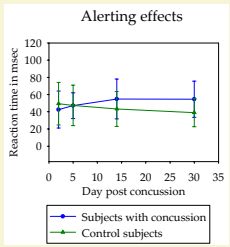
The ANT breaks attention down into three components: alerting, orienting, and executive attention. The processing efficiency of each of these components is assessed through reaction time.

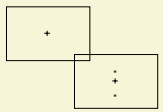
MEAN REACTION TIME



Subjects with concussion require greater processing time.

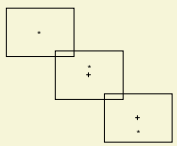
ALERTING

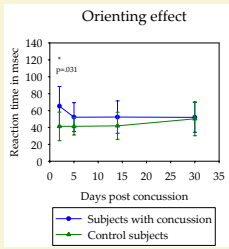


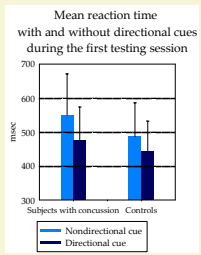


No significant difference was established between performance of subjects with concussion and control subjects.

ORIENTING

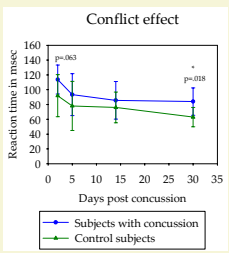


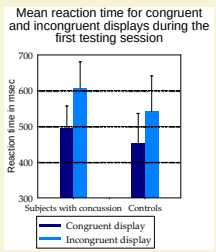




Subjects with concussion benefit more from directional cues than control subjects.

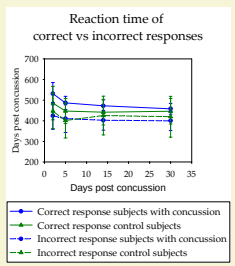
EXECUTIVE

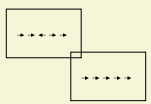




Subjects with concussion have difficulties resolving visual conflict.

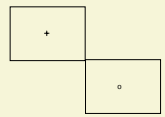
Subjects with concussion require more time to make a correct response and less time to make an incorrect response.



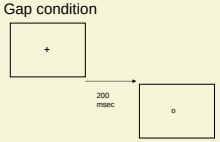


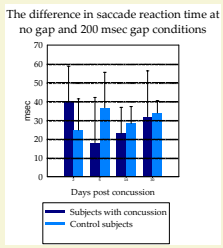
SACCADES

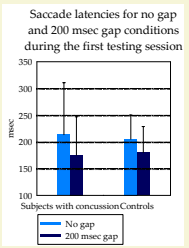
No gap condition



Gap condition







Although no significant difference was found between subjects with concussion and controls in the simple saccade task, there is a trend for the subjects with concussion to demonstrate a larger gap effect during the first 48 hours post concussion . On recurring testing sessions they tend to demonstrate a smaller gap effect compared to control subjects.

CONCLUSIONS

- Simplistic saccade tasks do not differentiate between subjects with concussion and controls.
- The orienting and executive components of attention are affected by concussion.
- These attentional components are associated with distinct patterns of brain activation; therefore, specific neuroanatomic regions may be more affected by concussion.

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ACKNOWLEDGEMENTS

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