ATTENUATED GENERAL STARTLE REACTIVITY IN ADOLESCENT ATHLETES WITH A CONCUSSION HISTORY

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BACKGROUND

Concussions are a significant public health problem. Most concussion symptoms resolve quickly but lingering difficult-to-detect sensorimotor impairments lead to increased risk of musculoskeletal injury (e.g., ACL tear)3.

Standard clinical assessments used to clear athletes to return to sport currently lack the sensitivity and reliability to detect subtle—yet critical and persistent—post-concussion sensorimotor deficits2.

Due to its narrow structure and sensitivity to rotational forces, the brainstem is particularly vulnerable to injury from head impacts2,4. The startle response is directly brainstem mediated making it liable to be impacted by concussion.

Rodent models of concussion show suppressed startle reactivity for weeks following injury3.

We examined general startle reflex in adolescent athletes with a concussion history compared to healthy controls to begin to evaluate its utility as a marker of post-concussion sensorimotor deficiency.

METHODS

33 adolescent athletes

With a concussion history
N = 23
Age: 14.7 ± 1.8 years
60% female

Without a concussion history
N = 10
Age: 13.3 ± 2.8 years
57% female

We measured mean general startle reactivity to auditory probes using standard procedures following SPR guidelines.

RESULTS

General Startle Reactivity was significantly lower in adolescents with a concussion history, b = -100.8, t = 3.51, p = 0.001.

For every additional concussion, general startle reactivity was 29 microvolts lower, b = -29, t = -2.41, p = .022

CONCLUSIONS

These preliminary results suggest novel evidence for attenuation of acoustic startle magnitude in adolescents with a concussion history for years after concussion.

There may be a dose-response relationship with concussion history.

General startle reactivity may aid the assessment of lingering sensorimotor dysfunction beyond that detectable from standard clinical assessment.

As general startle reactivity continues to be used within NIMH RDoC’s Sensorimotor Domain, its ability to aid clinical identification of concussion recovery and readiness to return to sport should be further explored.

REFERENCES AND FUNDING


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103 dB

We analyzed general reactivity in a General Linear Model (GLM) with a between-subjects regressor for group (concussion history vs. healthy control) and an exploratory GLM with a between subject regressor for number of concussions.